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A Report for the Ontario Council of Health,
senior advisory body to the
Minister of Health

1982

Smoking and Health in Ontario: A Need for Balance

Report of the Task Force on Smoking
Submitted to the Ontario Council of Health
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The Task Force on Smoking has been supported steadfastly by many individuals. The Ontario Council of Health staff are an exceptionally professional group who have been unstinting in their efforts to facilitate. We have appreciated especially the ongoing support of Dagmar Horsburgh, her excellent management of Task Force operations, and her wise counsel. Judy Wu brought her quite remarkable organizational ability and energy to her involvement with the Task Force. The Task Force was awed by the quality of her work and the efficiency with which things got done.

The Health Research and Development Committee, first under the Chairmanship of George Connell and later Donald Layne, was always an excellent parent Committee. It provided firm but flexible direction. The Task Force was impressed with the careful consideration accorded its progress, and the thoughtful and constructive advice at each step.

A great deal was accomplished by the Task Force research assistants, Josie d'Avernas and Marilyn MacKenzie. Both were unusually dedicated, and each brought special gifts. Josie d'Avernas shepherded the Task Force through its first year of operation, succeeding admirably in the very difficult task of pulling together the ideas, working memoranda, and preliminary reports generated by the Task Force's diverse membership. Marilyn MacKenzie contributed her organizational talents, and her great sensitivity to individuals and groups in the community, to provide opportunity for their contributions to the Task Force. We also want to thank these many individuals and groups for their genuine interest in the Task Force and their enriching input.

Both Josie d'Avernas and Marilyn MacKenzie seemed true members of the Task Force. So it was with observers to the Task Force: John Keays from the Ontario Ministry of Health, and David Thornton from Health and Welfare Canada. Both gave freely of their time and effort. Both contributed a keen sensitivity to smoking and health issues, born of their years of experience in the area. The Task Force benefited particularly from John Keays' personal knowledge of the history of smoking and health activity in Ontario and from David Thornton's wide ranging and in-depth appreciation for past and current efforts elsewhere in Canada.

Finally, as Chairman of the Task Force, I want to express my deep appreciation to each of the individual Task Force members. This has been a remarkable experience. I have been impressed over and over again with the intellectual sophistication, flexibility, and honesty of the members. I have been struck repeatedly by the commitment of each to the aims of the Task Force. But most moving have been the ways in which people have worked together, supporting each other's contributions, challenging as necessary, and learning to appreciate and integrate others' perspectives.

J. Allan Best, Ph.D.
May, 1982

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July 29th, 1982.

The Honorable Larry Grossman
Minister
Ministry of Health
10th Floor
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QUEEN'S PARK

Dear Mr. Grossman:

For your consideration, I am pleased to transmit the Final Report of the Task Force on Smoking which was presented to the Ontario Council of Health on May 18, 1982.

Before its presentation to Council, the Report was submitted to three external reviewers for a critique of its methodology, internal consistency and overall quality.

Regarding the recommendations of the Task Force, Council felt some were based on incomplete data, and others were more in the political than the scientific field, for example, those relating to agriculture and the tobacco industry, and to taxation. Two recommendations did not receive the support of the Parent Committee, the Health Research and Development Committee. The first had to do with the production of a "safe" cigarette or tobacco substitute, which it did not see as a health research priority. The second had to do with the concept of a free-standing Resource Centre for Smoking and Health. The Committee felt rather the possibility should be explored of using more effectively the existing structures to focus and augment efforts in this area.

Because of these reservations Council is not prepared to endorse or reject individual recommendations, but feels that they should speak for themselves in conjunction with the Report and the data behind it.

Council was enthusiastic in recognizing the Report as a broad survey of all the issues relating to smoking, and thus making an important contribution to public awareness and focusing attention on some of the policy questions which relate to the whole area of smoking.

Council therefore resolved that the Report should be forwarded to you and that it be published by Council in due course as a Report of the Task Force on Smoking.

Yours sincerely,

R. BRIAN HOLMES, M.D.
Chairman

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TABLE OF CONTENTS

Page

Summary 1

Chapter 1 — Introduction 3

Chapter 2 — The Problem of Smoking 5

- The Health Consequences of Smoking 5
- Trends in Smoking 6

Chapter 3 — A Need For Balance 8

Chapter 4 — A Smoking Control Program for Ontario 9

- Goals for Ontario 9

Chapter 5 — Recommendations 10

- Regulation and Policy Measures 10
  - Recommendation 1 — Protection from Passive Smoking 10
  - Recommendation 2 — Additional Protection of Special Groups 11
  - Recommendation 3 — Smoking in the Workplace 12
  - Recommendation 4 — Increases in Tobacco Taxation 13
  - Recommendation 5 — Prohibition of Tobacco Promotion 13
- Program Measures 15
  - Recommendation 6 — Program Development Funding 15
  - Recommendation 7 — Smoking Prevention 16
  - Recommendation 8 — Programs for Adult Smokers 17
- Research Priorities 19
  - Recommendation 9 — Less Hazardous Uses of Tobacco 19
  - Recommendation 10 — Smoking Processes 20
  - Recommendation 11 — Acquisition by Minors 21
- Co-ordination Mechanism 22
  - Recommendation 12 — Resource Centre for Smoking and Health 22
- Priority of Recommendations 24

Chapter 6 — Implementation 25

- Resources for Implementation 25
- Co-ordination 27
- Community Organization 27
- Planning 29
- Evaluation 29

Chapter 7 — Conclusion 31

Appendices

1. Smoking and Health in Ontario: Organizations and Current Status 33
2. Smoking Trends in Ontario 46

3A.1 The Health Risks of Involuntary Smoking 53

3A.11 Social-psychological Factors Influencing Individual and Community Attitudes, Policies and Behaviours Concerning Restrictions on Smoking 62

B. Marketing 65

C. Prevention and Change Programs 84

References 106

Members of the Ontario Council of Health 122

Reports of the Ontario Council of Health 124

SUMMARY

Smoking is the greatest single preventable cause of disease, disability, and death in our society. The problems for Ontario are complex because (a) economic, social, and political perspectives also need to be considered, (b) difficult changes by both individuals and larger social complexes are required, and (c) a pragmatic program of research, policy and program measures must be developed.

The aim of the Ontario Council of Health Task Force on Smoking was to review existing knowledge, and based on this review, to formulate recommendations designed to redress smoking and health problems in Ontario, through increased and improved research and development, and through effective programs and policies. The Task Force concluded that the cornerstone of an effective smoking program for Ontario must be the co-ordinated use of varying strategies. Both empirical evidence and experience in other jurisdictions suggest that an effective smoking program requires a balanced approach.

A government program will be most effective if it includes a mix of educational, legislative, economic, research, and organizational measures.

Recent research and program development successes provide promise, but a smoking program must include both further research, and program and policy measures.

Programs must be implemented at the community level. However, the associated needs for community organization and regional variation must be complemented by central research and program development.

The Task Force on Smoking suggests a statement of goals for a smoking program in Ontario, and makes twelve recommendations in four areas: regulation and policy, program, research, and co-ordination.

GOALS

1. To reduce the prevalence of smoking in Ontario:

(a) by encouraging non-smokers, particularly young people, not to start smoking, and
(b) by helping smokers to stop smoking.

2. To minimize the health consequences of smoking in Ontario:

(a) by protecting those who do not smoke from the discomfort, irritation and health risks associated with exposure to secondhand smoke, and
(b) by encouraging those who smoke to minimize their exposure to harmful tobacco constituents through changes in tobacco products used or smoking behaviours.

RECOMMENDATIONS

Recommendations are concerned with the following areas:

Regulation and Policy Recommendations

1. protection from passive smoking.
2. additional protection of special groups.
3. development of smoking in the workplace programs and protective measures.
4. increases in tobacco taxation.
5. prohibition of tobacco promotion.

Program Recommendations

6. program development funding contingent upon program developer and researcher collaboration.
7. development and implementation of school-based smoking prevention programs.
8. development and implementation of community programs for adult smokers.

Research Recommendations

9. less hazardous uses of tobacco.
10. smoking onset, maintenance, and change processes.
11. acquisition of cigarettes by minors.

Co-ordination Recommendation

12. establishment of a Resource Centre for Smoking and Health.

Because the Task Force stresses the importance of integrating policy, program and research, the recommendations often are inseparable from their implementation. A discussion of implementation issues includes specific suggestions in the areas of resource needs, co-ordination, community organization, planning, and evaluation.

The Task Force concludes that a well developed and concerted smoking program would reduce substantially the smoking, and therefore health, problem in Ontario.

Chapter 1

INTRODUCTION

"Smoking-related diseases are such important causes of disability and premature death in developed countries that the control of cigarette smoking could do more to improve health and prolong life in these countries than any other single action in the whole field of preventive medicine" (WHO Expert Committee, 1975).

Smoking and health problems in Ontario present a profound public health challenge for four reasons:

1. The health consequences of smoking are multiple and serious.
2. The prevalence of smoking is high.
3. Evaluations of past programs show that it is difficult to prevent smoking onset in youth, and that smoking is an extraordinarily tenacious habit once established.
4. Our health care system has not developed to accommodate the preventive approaches required with smoking. Furthermore, experience suggests that extensive co-ordination of services at the community level, and intensive effort, are required to be effective.

The overall aim of the Ontario Council of Health Task Force on Smoking was to formulate recommendations designed to redress these smoking and health problems in Ontario, through increased and improved research and development, and through effective programs and policies.

The Task Force was established by the Health Research and Development Committee of the Ontario Council of Health. Memberships of the Committee and the Task Force are listed at the beginning of this Report. The Task Force first met in September, 1980, and regularly each month thereafter. The terms of reference were:

1. (a) To review the existing knowledge base on tobacco smoking as it relates to disease causation and to the distribution and determinants of smoking, and
   (b) To relate this knowledge to the problem of smoking in Ontario.
2. To review effective strategies to prevent initiation of smoking and to stop smoking once started, and to develop specific recommendations for programs to reduce smoking in Ontario in the light of existing knowledge.
3. To identify specific priorities for health research and development to fill the remaining gaps in knowledge, policy and services essential to the effective prevention and cessation of smoking.

Membership of the Task Force was selected to include both researchers and community programmers. Major perspectives on smoking and health were reflected in the Task Force composition to ensure breadth in its deliberations, including such specific expertise as: epidemiology, occupational health, public

health, primary care, community organization and public education, health behaviour and behaviour change, pharmacology and addictions, pulmonary medicine, and health planning. Observers from both Provincial and Federal governments contributed to the Task Force discussion and decisions.

The Task Force considered alternative approaches to its terms of reference. It was decided that a policy analysis approach would serve to bring together scientific and service perspectives, providing recommendations which would be useful to both. Actual or possible policies were identified, and current knowledge surrounding each policy was reviewed. The approach served the dual functions of providing data on the validity of policy options, and pointing to gaps in current information.

The Task Force also identified some 50 Ontario organizations with an interest in smoking and health (see Appendix 1). Input was sought from these organizations to provide opportunity for suggestions and to ensure that the Task Force was sensitive to community perspectives. Each was invited to submit a brief to the Task Force and some to attend a series of meetings to discuss key issues identified by the Task Force.

Chapter 2

THE PROBLEM OF SMOKING

Smoking is a problem because it is a major and preventable cause of ill-health, disability, and premature death. Smoking by adults causes harm to users, harms or irritates others (including the unborn), provides a bad example to children, and complicates the setting of safe levels of air-borne pollutants in industrial plants and elsewhere. Smoking by children, in addition to causing disease, frequently leads to a tenacious adult smoking habit. Other problems of concern are the presentation to the public of information about smoking, which is unbalanced in favour of the advertised attractions of smoking, and the inadequacy of treatment for the smoking habit itself and for most smoking-related diseases. Society has a legitimate interest in smoking because smokers can harm themselves and others, and because smokers may have less than full control over their smoking. A realistic approach to controlling the adverse consequences of smoking must take into account the concept of individual freedom of action that is an underlying feature of our society, as well as the economic and social aspects of tobacco production, manufacture, and use.

In sum, both at the individual and community level, the problems of smoking do not lend themselves to simple solutions. Yet the health consequences of smoking make effective control imperative. The magnitude, seriousness, and multiplicity of health consequences of smoking are clear, and well-documented; the need for concerted action cannot be questioned from a health perspective. However, possible measures involve social, economic, organizational, and political factors. Furthermore, simple solutions will not be forthcoming because the solutions involve change in complex attitudes and behaviours, changes both by individuals and by the larger social complexes that comprise the community.

In its review, the Task Force took into account political, economic, and organizational impacts. However, the Task Force viewed itself as having primarily a health mandate. It realized that the implications of these other perspectives require further development.

THE HEALTH CONSEQUENCES OF SMOKING

There are many harmful effects of smoking. A very large and still rapidly growing literature supports five main conclusions:

1. *Smoking causes death, disease and disability.* Overall, death rates for male smokers are 1.7 times higher than for nonsmokers, 1.3 times higher for females. The risk of dying between the ages of 35 and 65 is 2½ times higher for daily smokers of 25 cigarettes or more than for non-smokers. Coronary heart disease is the chief contributor to the excess mortality; death rates also are higher for chronic obstructive lung disease, and for several cancers, especially lung cancer.

Smokers also are ill more, with such conditions as chronic bronchitis, emphysema, chronic sinusitis, peptic ulcers, atherosclerotic heart disease and influenza. Female smokers report 45% more lost work days, males 33% more, than do their non-smoking counterparts. Smoking cessation improves health; risks decrease more the longer the person has not smoked.

2. *Smoking affects the fetus and newborn.* Studies involving hundreds of thousands of pregnancies repeatedly show adverse effects of smoking over and above all other factors influencing the outcome of pregnancy. Fetal growth is retarded, and birth weight and size are reduced. Spontaneous abortions, still births, and early infant deaths are all increased. Direct harmful effects have long term physical and developmental consequences.

3. *Second-hand smoke can increase health risks.* Evidence in this new research area is accumulating rapidly. Cigarette smoking in various everyday environments may give rise to levels of harmful substances (e.g. carbon monoxide, particulates, nicotine) well above those normally found in the absence of cigarette smoke, and often in excess of standards for human exposure. Tobacco smoke aggravates symptoms in nonsmokers with various pre-existing diseases. Parental smoking has adverse effects on otherwise healthy children. Quite brief (10-15 minute) exposure may increase discomfort and the likelihood of eye infection in healthy adults; daily exposure over many years has been shown to impair respiratory function and may increase the likelihood of lung cancer in non-smoking adults. Second-hand smoke is a significant source of annoyance and irritation in both smokers and non-smokers.

4. *Smoking interacts with other substances,* to increase the risk of a number of diseases. Occupational exposure to asbestos, uranium, coal dust and petrochemicals all interact synergistically with smoking. Furthermore, use of oral contraceptives by women who smoke increases cardiovascular risks, especially in those 30 years of age and older.

5. *Smoking increases the risk of accidental injury and death.* Risk of fire increases with smoking, affecting both smokers and non-smokers. There is speculation that the risk of industrial, automobile, and other accidents may be increased by the effects of smoking on psychomotor activities.

TRENDS IN SMOKING

There are about two million regular smokers in Ontario. Over the last fifteen years, the proportion of Ontarians 15 years of age and over who smoke has declined steadily, from 41.4% in 1965 to 31.3% in 1979. Thus, the decline has been nearly one-quarter and now smokers are clearly in the *minority*. The decline has been most marked for males (from 52.0% in 1965 to 34.4% in 1979), but present for females as well (from 31.1% in 1965 to 27.9% in 1979). The rates in Ontario are now among the lowest in Canada, although still higher than rates

in many parts of the U.S. and Scandinavia. Further details of smoking trends are presented in Appendix 2.

The decline has occurred in most age groups, the notable exception being young females (age 15–19) for whom rates have increased to the point that they exceed rates for young males. The proportion of young female smokers appears to have stabilized since 1975.

A different pattern emerges with respect to amount smoked. The decline in smokers has been almost entirely among smokers of fewer than 25 cigarettes a day. For males, there now are only one-half the number of regular smokers in that category than there were fifteen years ago. But there has been little change in the proportion of regular heavy smokers (more than 25 cigarettes daily). The prevalence of female heavy smokers actually has increased. The daily number of cigarettes per smoker has *increased* steadily over the past 15 years.

Male smoking rates are higher in less educated groups. For females, the higher smoking rates are among those with some high school education, while lower rates are found in the least educated, and those with university education.

Youth have been experimenting more with smoking, and at younger ages. By age 12, 50% of Ontario school children have tried smoking. By age 14, 17% of the boys and 22% of the girls are daily smokers. Ontario data for 1981 suggest that smoking by youth now is declining. The percentage of smokers in grades 7–13 is down from 1979 for both males and females.

In sum, rates of adult smoking in Ontario have been declining, offering hope that more effective smoking control measures may accelerate these trends. However, rates of heavy smoking have not decreased. In males, higher rates of smoking have been found in the less educated and blue collar groups. Female smoking rates suggest two new trends: there now is more smoking among women with high school education, and more young women smoke. The increased smoking among young women highlights the need for more effective smoking prevention programs.

Chapter 3

A NEED FOR BALANCE

There have been continuing smoking control efforts in Ontario since the early 1960's. However, measures by health organizations and government have been relatively unco-ordinated and certainly not in keeping in magnitude with the health importance of smoking. Organizations and individuals have made major and continuing investments in the smoking control area; however, it is quite clear that much more is needed. In particular, a sustained program of varied initiatives is needed to achieve a significant impact on the smoking problems of Ontario.

Research now indicates promise in several areas, and both recent trends in smoking and increased interest in various sectors suggests that the time for concerted action has come. Balance is needed among various kinds of government measures, between research and action, and among the efforts of diverse groups central to the development and implementation of a comprehensive program:

1. Government actions will be most effective if they include a mix of educational, legislative, economic, research, and organizational measures. Early work suggested that an educational approach might be sufficient. Recent research makes it clear that a variety of initiatives is required.
2. Available research suggests promise, but more research is needed to complete development of effective programs. A combination of research, program, and policy initiatives is indicated.
3. Development of effective programs for individuals requires collaboration between behavioural scientists skilled in the development of efficacious strategies, and programmers experienced in the planning and provision of effective and efficient smoking programs.
4. Community organization is necessary to ensure the development of efficacious programs:

— Health organizations differ and need a degree of autonomy. At the same time, co-operation in the various program areas will increase efficiency and effectiveness.

— Programs vary in their effects and role as part of a comprehensive initiative. In particular, there need to be multifaceted programs balanced between (i) mass media programs which increase environmental and social supports encouraging nonsmoking, and (ii) more intensive, face-to-face programs aimed at youth and at adult smokers wishing to change their smoking behaviour.

— Some program development requires centralized expertise and resources. Behavioural science research indicates that programs often must be highly developed and standardized to be effective. However, there also must be room for community initiative and flexibility to accommodate local needs.

— Community organization should rely on existing resources where appropriate and feasible. Where new resources clearly are needed, they should be made available.

Chapter 4

A SMOKING CONTROL PROGRAM FOR ONTARIO

The foregoing review of the smoking and health problem, as seen by Task Force on Smoking, can be summarized as follows. Smoking is a major and complex health problem in Ontario. The health consequences of smoking are well-established. Ontario should formulate a smoking program which builds on promising policy, program development and research measures. The Task Force on Smoking composition and process both were designed to ensure a pragmatic and balanced approach.

What follows is first a statement of goals for an overall smoking program for Ontario, followed by a short set of key recommendations which provide a basis for such a program, and a discussion of some of the implementation issues and options relating to the recommendations.

GOALS FOR ONTARIO

The purpose of a smoking program for Ontaro is to reduce the number of smokers in Ontario, and, as a consequence, to reduce the incidence of smoking-related disease and disability. Based on past government initiatives, the Task Force believes that the goals for such a program should be:

1. To reduce the prevalence of smoking in Ontario:
(a) by encouraging non-smokers, particularly young people, not to start smoking, and
(b) by helping smokers to stop smoking.
2. To minimizc the health consequences of smoking in Ontario:
(a) by protecting those who do not smoke from the discomfort, irritation and health risks associated with exposure to second-hand smoke, and
(b) by encouraging those who smoke to minimize exposure to harmful tobacco constituents through changes in tobacco products used or smoking behaviours.

It is important that Ontario plays its role in the world-wide effort to control smoking and health problems. Significant social change takes decades with a problem such as smoking. Change will be slow and gradual, and expectations for progress towards these goals accordingly must be modest.

Chapter 5

RECOMMENDATIONS

Task Force recommendations were selected on the basis of the:

1. Nature and strength of the scientific evidence.
2. Perceived scientific, organizational, economic and social feasibility.
3. Potential impact on smoking and health in Ontario.
4. Degree to which the recommendation is supportive of smoking program goals.
5. Degree to which the recommendation describes a priority for the Province of Ontario relative to other jurisdictions.

Twelve recommendations are proposed, in four areas: regulation and policy measures, development and implementation of smoking programs, research, and co-ordination. The analyses underlying these recommendations are included in Appendix 3. Issues regarding their implementation are discussed in a later section. Each recommendation is stated with following outline of its rationale.

REGULATION AND POLICY MEASURES

RECOMMENDATION 1:
Protection from Passive Smoking

IT IS RECOMMENDED THAT THE GOVERNMENT OF ONTARIO TAKE LEGISLATIVE MEASURES TO ENSURE A UNIFORM STANDARD OF PROTECTION FROM PASSIVE SMOKING IN SPECIFIED PUBLIC PLACES IN ALL JURISDICTIONS OF THE PROVINCE.

IN ADDITION, IT IS RECOMMENDED THAT THE GOVERNMENT ADOPT IMMEDIATELY NON-SMOKING PROVISIONS IN THE PUBLIC AREAS WITHIN ITS OWN BUILDINGS AND FACILITIES.

IT ALSO IS RECOMMENDED THAT THE GOVERNMENT ADOPT POLICIES TO PROHIBIT OR OTHERWISE EFFECTIVELY CONTROL SMOKE IN TRANSIT SYSTEMS WHICH THE GOVERNMENT LICENSES OR SUBSIDIZES.

The rationale for these restrictions on smoking is twofold:

1. The public needs to be protected against the health hazards and discomfort associated with exposure to second-hand smoke.
2. Development of environmental and social supports encouraging non-smoking is fundamental to other recommendations and an effective smoking program.

Second-hand smoke adversely affects both the healthy and the unhealthy. Restrictions on smoking in public places are likely to contribute significantly to the establishment of nonsmoking as normative behaviour. Research suggests that such norms play a major role in individual decisions. Perhaps for these reasons, surveys show that an increasingly large *majority* of the Ontario public, smokers and nonsmokers alike, favour restrictive measures.

Regulations can be introduced in various ways. Provincial legislation is the most direct way to ensure a uniform standard, and perhaps the only feasible means of protection in some areas of the province. However, the strongest rationale for *provincial* legislation may be the development of nonsmoking norms. Inference from basis research suggests that clear action by the Province is likely to have a significant impact on public attitudes, because it represents a clear, credible communication to which people will pay attention.

The proposed Health Protection Act is one mechanism which could provide for enforcement of the measure. However, there is suggestive evidence that such restrictions are largely self-regulatory and enforcement need only be minimal to achieve the effects on non-smoking norms.

RECOMMENDATION 2:
Additional Protection of Special Groups

THE GOVERNMENT OF ONTARIO SHOULD AMEND THE PUBLIC HOSPITALS ACT TO REQUIRE HOSPITAL BOARDS AND DIRECTORS TO MAKE PROVISION FOR SMOKING AND NONSMOKING AREAS SO AS TO ENSURE THAT NON-SMOKING PATIENTS ARE NOT EXPOSED TO TOBACCO SMOKE UNLESS THEY CHOOSE TO BE SO EXPOSED. SIMILAR LEGISLATIVE CHANGES SHOULD BE MADE FOR NURSING HOMES AND OTHER RESIDENTIAL HEALTH CARE FACILITIES.

IT ALSO IS RECOMMENDED THAT NURSERIES AND DAY CARE CENTRES WHICH FALL WITHIN GOVERNMENT REGULATIONS BE REQUIRED TO PROHIBIT OR OTHERWISE EFFECTIVELY CONTROL SMOKING ON THEIR PREMISES.

Smoking and second-hand tobacco smoke may have more serious health and psychosocial implications for some populations served within Ontario health and educational institutions. Those with existing disease and ill health, and young children, are more susceptible to the adverse effects of second-hand smoke. There has been a major opinion shift towards smoke-free areas in health care facilities. Indeed, Ontario hospital policies have been gradually reflecting this shift. However, there is a gap between policy and practice. For this reason, amended legislation would facilitate the implementation of more consistent and comprehensive policies, and their enforcement. A significant contribution would be a shift in responsibility to the hospital to ensure smoke-free care areas, rather than to place the onus on the ill patient to request a smoke-free environment.

Restrictions in nurseries and day care centres rest on two kinds of rationale. There is evidence that smoking in the home increases the prevalence of respiratory disease in young children. There is no reason to think that smoking in other care settings would not have comparable effects. The second rationale rests on the clear, consistent evidence that the major contributors to smoking in youth are social influences. The effects of parents, siblings, and peers are well documented. The processes leading to smoking onset are not understood well enough to assert that smokers in nursery and day care settings for young children would have significant social modelling effects similar to those shown for parents. However, there is evidence that children are aware of smoking at an early age. There is suggestive evidence concerning modelling effects in many related health education research areas. In sum, the health protection rationale is reasonably well founded in scientific literature. Significant social influence has not been demonstrated directly, nor can it be, because of the complexity of smoking onset and the cumulative effects of influences as the child grows older.

RECOMMENDATION 3:
Smoking in the Workplace

THE GOVERNMENT OF ONTARIO SHOULD DEVELOP AND DEMONSTRATE EFFECTIVE STRATEGIES FOR LIMITING SMOKING IN THE WORKPLACE, STARTING WITH THE GOVERNMENT WORKPLACE, AND SUBSEQUENTLY PROMOTE THE IMPLEMENTATION OF SUCH PROGRAMS IN BUSINESS, COMMERCIAL AND INDUSTRIAL ESTABLISHMENTS.

IT ALSO IS RECOMMENDED THAT THE GOVERNMENT SPECIFICALLY PROVIDE NON-SMOKING EMPLOYEES THE RIGHT BY LAW TO APPLY FOR AND RECEIVE, WITHOUT PREJUDICE, RELIEF FROM EXPOSURE TO SECOND-HAND SMOKE IN THEIR USUAL WORKPLACE.

The Ministry of Health already has developed initiatives to control smoking in the government workplace. The acceptance and success of these measures reflect the shift in social climate which has occurred in recent years. Stronger smoking initiatives now are more likely to be well received.

Limitations on smoking in the workplace serve two ends:

1. The workplace is likely to be a particularly important environment for the development of non-smoking norms.
2. The health consequences of smoking in the workplace are significant and varied.

Surveys in Ontario suggest that perhaps one-third of all employees experience discomfort. A variety of disabling effects may interfere with ability to work. The long term health consequences of sustained exposure may be significant. Finally, in some settings smoking interacts with other occupational factors to increase risk greatly.

RECOMMENDATION 4:
Increases in Tobacco Taxation

IT IS RECOMMENDED THAT THE GOVERNMENT OF ONTARIO TAKE ACTION TO ENSURE THAT THE RETAIL PRICE OF CIGARETTES BE DOUBLED WITHIN A 12-MONTH PERIOD BY MEANS OF THREE PHASED INCREASES IN BASIC TAXATION ON TOBACCO PRODUCTS, AND ENSURE THROUGH TAXATION THAT THE PRICE OF CIGARETTES KEEPS UP WITH INFLATION THEREAFTER.

It has been well documented that cigarette consumption goes down when the price of cigarettes relative to inflation goes up, and vice versa. How much cigarette consumption would decline in Ontario with a given increase in price can only be estimated.

British experience suggests that relatively large increases over a short period of time are necessary to produce the desired effect.

Several considerations favour this measure as part of a comprehensive program:

1. It probably is the most direct and reliable way to reduce the overall amount of smoking in the Province. Its rapid and substantial effect should make a marked contribution to social climate and facilitate other recommendations.
2. Surveys suggest that public acceptance of the measure may be good.
3. The measure would be productive of additional government revenue, which could be used to finance other components in an overall smoking program.
4. The impact would be especially strong on young people, who have less disposable income and whose smoking is a particular problem for society. Very recent scientific evidence underscores the great significance of this measure for smoking prevention.

RECOMMENDATION 5:
Prohibition of Tobacco Promotion

The Task Force supports the World Health Organization position that there should be total prohibition of all forms of tobacco promotion in all countries. Whereas the Task Force believes that Ontario has a role to play in achieving this objective for Canada,

IT IS RECOMMENDED THAT THE ONTARIO GOVERNMENT INITIATE DISCUSSIONS TO ENCOURAGE THE FEDERAL GOVERNMENT TO TAKE ACTION PROHIBITING PROMOTION OF TOBACCO.

IT IS FURTHER RECOMMENDED THAT, WITHIN AREAS OVER WHICH IT HAS JURISDICTION, THE ONTARIO GOVERNMENT SHOULD PROHIBIT ALL FORMS OF TOBACCO PROMOTION, AND STRENGTHEN CURRENT HEALTH PROMOTION ACTIVITIES ENCOURAGING NON-SMOKING AS PART OF A HEALTHY LIFESTYLE.

Three major considerations provide a rationale for the recommendation:

1. There is a significant likelihood that advertising and other tobacco promotion serve to increase the overall consumption of tobacco in Ontario.
2. Tobacco promotion is inconsistent with the stated aim of the Ontario Ministry of Health to encourage prevention of disease and increased individual responsibility for health. Lack of government action may undermine the effectiveness of a smoking program.
3. The ethics of tobacco promotion are questionable.

The scientific base for restraints on tobacco promotion never will be firm. Increases or decreases in tobacco promotion always occur in the context of societal change and other influences. Thus, the data cannot be conclusive. There is suggestive evidence from many jurisdictions both that increased promotion increases consumption and that decreased promotion decreases consumption. The annual promotion expenditure of the industry in this country makes it unlikely that promotion is not seen to affect consumption, if not by actually increasing it then by maintaining relatively high smoking levels.

Tobacco promotion is especially likely to have a significant effect on consumption by young people. There is a solid scientific base demonstrating the significance of other social influences on smoking onset. Research concerning the reasons children smoke is incomplete with respect to this issue. However, what is known about smoking in particular, and what is known about child development in general, provide an impressive inferential base for the assertion that promotion does play a significant role in the onset process.

Effects of tobacco promotion on the recruitment of new smokers provide sufficient rationale for a ban. Promotion may affect adults as well, but the evidence is inconclusive. It is argued by the industry that the sole effect of promotion in a market such as Ontario's is to influence brand selection by persuading smokers to switch from one brand to another. Recognizing that the scientific data cannot be definitive, many scientists nevertheless have challenged the credibility of this position. It also has been suggested that the argument is specious if one considers various components of the smoker market — new youth and immigrants from developing countries constantly are entering the market, and there are substantial numbers of adult smokers who indicate they would like to quit and thus leave the market.

In sum, while scientific evidence concerning the effects of tobacco promotion on consumption can never be definitive, the convergence of several kinds of data provides a reasonable basis for the recommendation. There is evidence that partial bans on promotion are not effective because manufacturers then make greater use of forms of promotion which are not banned; thus, the recommendation of a total ban.

A different rationale concerns the potential negative effects of inconsistency in government actions. The ability of government to contribute to the crucial development of a supportive environment for nonsmoking is a function of its credibility. Failure to regulate major contributors to smoking may limit seriously the effectiveness of other initiatives. Scientific support for this concern

can be drawn both from the substantial evidence relating credibility to attitude change and health promotion, and from the documentation in other jurisdictions that smoking programs including restrictions on tobacco promotion have been associated with decreased consumption. The specific contribution of restrictions on promotion cannot be isolated because of the interactive effects with other program components. However, it is precisely these interactive effects which are necessary to maximize the effectiveness of a balanced smoking program.

The third aspect of the rationale concerns the ethics of tobacco promotion. The social ethics of the active promotion of a major, lethal public health hazard are difficult to justify. Freedom of information and choice are considerations, but the enormous health consequences of individual failure to protect health create a circumstance parallel in some respects to the need for seat belt legislation, where the Government of Ontario did act with good effect.

A second, very clear ethical concern is the possible effect of tobacco promotion on youth. The majority of adult smokers begin before the age of maturity. Protection of youth is an established government responsibility. In the absence of clear evidence that tobacco promotion does *not* influence smoking onset, promotion of a dangerous and lethal product is highly questionable from an ethical and public health perspective.

PROGRAM MEASURES

RECOMMENDATION 6:
Program Development Funding

FUNDING FOR PROGRAM DEVELOPMENT PROJECTS IN ONTARIO SHOULD BE PROVIDED BY THE GOVERNMENT AND OTHER BODIES ONLY FOLLOWING DEMONSTRATION OF MECHANISMS FOR PRODUCTIVE ONGOING COLLABORATION BETWEEN PROGRAM DEVELOPERS AND RESEARCHERS.

Programs which effectively prevent youth from becoming smokers, or help adults reduce their smoking or quit, have been slow in development. Recent successes in both areas have come with intensive program development efforts, requiring:

1. Thorough understanding of the smoking process and more generally the population to be served.
2. Design of programs rooted in behavioural sciences advances.
3. Scientific evaluation of programs as implemented in the community.

Whereas in most Ontario communities there has been little interaction between smoking researchers and program providers, those programs which have been shown scientifically to be effective typically have involved considerable interaction. The Task Force has concluded that program development is more likely to result in effective programs if developers and researchers collaborate

throughout the full developmental process. Various mechanisms to facilitate collaboration can be envisioned, including provision of research consultants to agencies responsible for program development, the hiring and working together of both researchers and program planners by these agencies, and series of "bridging" workshop and training programs for both groups. Each mechanism has both advantages and disadvantages, and any one may be most desirable in particular circumstances. The simplest measure to encourage collaboration is to ensure that, whatever the mechanism, research and program funding for the activity is provided only if collaboration is assured.

RECOMMENDATION 7:
Smoking Prevention

PRIORITY SHOULD BE GIVEN TO DEVELOPMENT OF SCHOOL-BASED SMOKING PREVENTION PROGRAMS, WHICH ARE DESIGNED FOR WIDE-SPREAD DISSEMINATION, AND ARE AMENABLE TO ONGOING SCIENTIFIC EVALUATION. PROGRAMS PROVEN TO BE EFFECTIVE SHOULD BE IMPLEMENTED IN ALL ONTARIO SCHOOLS AS SOON AS POSSIBLE.

Smoking prevention is a priority because:

1. The cigarette smoking habit, once established, may be extraordinarily tenacious and difficult to change.
2. There is evidence that even a delay in smoking onset may have significant, long-term benefits.
3. Almost all adult smokers began smoking while school-aged.

Prevention has become an even greater priority because of two trends:

1. Increasing numbers of youth, particularly females, have begun smoking in recent years. This trend now may have levelled off, but the prevalence of smoking still is of great concern.
2. The age at which youth begin smoking has been decreasing.

Smoking prevention programs traditionally have had limited success. The greatest reason appears to be their limited scope. Programs typically increased knowledge of the health consequences of smoking, but stopped short of strategies to affect the value placed on nonsmoking and health, social norms and influences as they influence smoking, and the coping and decision-making skills necessary to resist significant influences.

During the last five years, an experimental approach to smoking prevention has focused on social influences. Programs teach children about social influences and train children in the skills necessary to resist them. The efficacy of the approach has been demonstrated in several large, independent projects. In contrast, the efficacy of alternative innovations has yet to be established satisfactorily. The consistent success of social influences programs provides a firm base for development and dissemination.

An analysis of common ingredients in effective programs suggests two pragmatic considerations:

1. Teachers typically are not trained fully in the behavioural science methods used in this kind of program.
2. Effective programs seem to require comprehensive, focused, intensive and continuing programming, and this requirement challenges existing health curriculum practices. Many schools use shorter, fewer, and more varied class periods than may be necessary for a social influences program to be effective.

We need both continuing research and development, and determination of how these programs can be implemented in the Ontario school system, before dissemination can take place. The Task Force believes that these steps can be completed within the next five years, and thus recommends that these programs be implemented by that time, or earlier. Planning must consider the respective responsibilities of the Ministries of Health and Education. School-based programs are recommended because of their potential effectiveness. However, while the Ministry of Education historically has accepted responsibility for health education and life skills, increased concentration on smoking prevention is likely to prove difficult, given competing demands on resources and curriculum time. Satisfactory ways to share responsibility need to be developed.

The Task Force recommends that research efforts focus on further development of social influences programs. However, we recognize that other kinds of programs are being developed and delivered. Certainly these activities should not be discouraged. School-based, social influences programs may be augmented greatly by complementary programs. Examples include programs to:

1. Develop health values and general life skills.
2. Influence the family, community, and other social milieu as they affect smoking onset.
3. Reduce smoking among teachers, youth leaders, and other exemplars.
4. Help youth who have begun smoking to stop.
5. Set school policies regarding smoking of staff and students, which have a social influence favouring non-smoking.

Relationships between these efforts and social influences programs have not been explored empirically. Nevertheless, the Task Force again advocates a balanced, comprehensive and continuing effort to achieve the greatest success in smoking prevention.

RECOMMENDATION 8:
Programs for Adult Smokers

PRIORITY SHOULD BE GIVEN TO THE DEVELOPMENT OF A RANGE OF EFFECTIVE PROGRAMS FOR THOSE ADULTS IN THE COMMUNITY WISHING TO STOP OR TO REDUCE THE HAZARD OF THEIR SMOKING. NECESSARY STEPS SHOULD BE TAKEN TO EN-

SURE THAT VARIOUS EFFECTIVE PROGRAMS ARE AVAILABLE FOR IMPLEMENTATION IN ALL ONTARIO COMMUNITIES WITHIN FIVE YEARS.

Between 50 and 90 per cent of smokers apparently would like to quit, but they may need assistance. The great health consequences underscore both a public health responsibility and a need for action. Effective prevention programs might provide a long-term solution to smoking and health problems. However, it is important to note that the benefits in terms of reduced mortality will not be realized for some years. Smokers represent one-third of the adult population. For them there is a fundamental public health responsibility to address what is a major preventable cause of death. Finally, a comprehensive program to reduce smoking in society will benefit increasingly from fewer adult smoking models for youth and less acceptance of smoking as the social norm.

The Task Force recommends that a range of programs be developed. Within a community, there should be a hierarchy of services varying in the effort required by both the smoker and the health system. Low effort programs such as a self-management book or a brief physician visit have advantages in terms of minimal cost and maximal accessibility. They also may be more acceptable to many smokers since there are data suggesting that smokers would prefer to change on their own. Higher effort programs, such as a community clinic, have a potentially much greater probability of success because they are more comprehensive and intensive. Ideally, smokers will select low effort programs for initial change efforts, and then if unsuccessful, move on to higher effort programs. For many smokers, several attempts may be required before permanent change is achieved. A range of programs is required to meet varying needs.

Despite extensive research over the past fifteen years, we still are far short of having a comprehensive range of programs of proven effectiveness. Nevertheless, the Task Force concludes that there has been sufficient progress to provide a base for a limited number of demonstration projects designed to develop community programs.

The Task Force concludes that at least four kinds of programs should be developed and implemented. The basis for the conclusion is elaborated in Appendix 3.

1. Well-designed, *intensive clinics* in the community or workplace are likely to achieve the highest success rates, but the required effort is high.
2. *Less intensive counselling* (such as might be provided through the primary care setting) may be less effective in general, but it reaches more smokers and provides an entry to hierarchical services.
3. *Media* programs can be complementary and effective, particularly when relatively intensive and integrated with a co-ordinated and sustained community project.

With each of these three kinds of programs, we recommend well-controlled demonstration projects to take the best available methods and develop, implement, and test programs at the community level.

4. The fourth kind of program is aimed at *reduced exposure*. Recommendation 9 outlines research needs in this area. Demonstration projects should follow such research.

Comprehensive projects to implement and evaluate on a population level the full range of programs should be encouraged. The Task Force believes that with concerted effort a range of programs can be developed and tested within five years. Necessary provisions for program materials, provider training, and program implementation would make it possible to disseminate programs to Ontario communities at that time.

RESEARCH PRIORITIES

Research is a key component in the program development involved in the Program Recommendations. The Task Force identified three additional research priorities which address current gaps in knowledge and which complement other recommendations. In effect, research in these areas would provide data on which program development could build.

RECOMMENDATION 9:
Less Hazardous Uses of Tobacco

RECOGNIZING THAT A SIGNIFICANT NUMBER OF ONTARIO RESIDENTS, DESPITE THE BEST EFFORTS, WILL CONTINUE TO SMOKE FOR SOME YEARS TO COME, IT IS RECOMMENDED THAT RESEARCH LEADING DIRECTLY TO THE FURTHER LABORATORY EVALUATION, AND FIELD TESTING OF "LESS HAZARDOUS" USES OF TOBACCO AND TOBACCO SUBSTITUTES BE GIVEN RESEARCH PRIORITY.

This recommendation follows directly from the preceding recommendation which called for the development of programs promoting "less hazardous" smoking, as one component in a range of community services.

The key issue is whether or not "less hazardous" smoking is in fact less hazardous. This is a real concern, because safety has not been established yet and further research is needed. Manufacturers increasingly are marketing cigarettes which supposedly deliver less tar and nicotine, but at least some smokers may not actually take in less.

Furthermore, the health safety of some additives has not been established. Thus, it is essential that the necessary measurement techniques be developed, and that there be objective evaluation of safety, and ongoing monitoring of these "less hazardous" products.

If the hazardous substances in cigarette smoke can be reduced, then the potential for reducing risk to Ontarians of cigarette smoking is considerable. Many adult smokers may prefer to reduce their risk rather than to quit smoking entirely. For this reason, the Task Force uses the term "smoking change" to refer to both smoking cessation and "less hazardous" smoking.

Ontario already has active research programs in this area. Research into the efficacy of "less hazardous" tobacco products has measured the actual exposure to potentially harmful constituents (e.g. nicotine, "tar", and carbon monoxide). Findings show that the way the cigarette is designed, and the yields of these cigarettes when smoked by a smoking machine to determine values printed on the package, do not predict people's actual exposure very well. As many as 40% of low-yield brand smokers compensate by changing the way they smoke the cigarette (e.g. taking larger puffs, inhaling more deeply, blocking with fingers or lips ventilation holes in vented-filter cigarettes) to achieve yields comparable to those seen for conventional cigarettes.

Several kinds of related research are needed:

1. Development of new and improved methods for monitoring (a) constituent yields during actual use, and (b) consequent exposure to both smokers and exposed non-smokers.
2. Study of retention, absorption, distribution, and elimination of constituents to determine body (or organ) burden over time.
3. Studies relating exposure data from retrospective and prospective histories to more objective exposure data, for the purpose of evaluating true constituent consumption.
4. Further development of promising behavioural techniques whereby smokers may change the way they smoke cigarettes to achieve lower exposure levels.
5. Research utilizing constituent measures of consumption to verify the nature and utility of alternate, less hazardous tobacco forms and substitutes, and to provide field tests of their general applicability.

RECOMMENDATION 10:
Smoking Processes

RESEARCH PRIORITY SHOULD BE GIVEN TO STUDIES DESIGNED TO INCREASE UNDERSTANDING OF FACTORS AFFECTING SMOKING ONSET, MAINTENANCE, AND CHANGE PROCESSES AS THEY RELATE TO PREVENTION AND CHANGE PROGRAMS.

Development of effective prevention and change programs has been hampered by an incomplete understanding of the processes they aim to influence. In both areas, research has provided sufficient understanding for effective programs to begin to emerge. However, effectiveness still is far from complete, and research answering fundamental but still unresolved questions in each area would contribute to the development of more effective programs.

Research has identified social influences as the most important factors in smoking onset. However, little is known about how these factors operate at the individual level. Why do individuals vary greatly in their response to these factors? Why do some individuals in a social group become smokers while others do not? Why do some start smoking at an early age and others do not until years

later? What is meant by "social influence", that is, what are the interpersonal processes and behaviours involved? How do these social influences interact with other factors known to be involved in the smoking onset process, such as (a) more general developmental processes, (b) self-esteem, and (c) addictive processes and biological predisposition? Finally, it is clear that smoking onset is a social phenomenon occurring in social groups. Yet most research has focused on the individual, and failed to measure group processes.

Smoking change programs lack answers to similarly basic questions. For example, consider the following:

1. An estimated forty million North Americans have stopped smoking, and others have switched to "lower yield" cigarettes. However, almost nothing is known about the problems which typically occur as people change, factors differentiating successful from unsuccessful changers, or the methods used by successful changers.
2. Evaluations of cessation programs make it very clear that initial cessation is relatively easy to achieve; maintenance of cessation is far less likely. Yet there are few data characterizing the circumstances and reasons associated with relapse.
3. Chronic smoking is influenced by both pharmacological and psychosocial factors. However, researchers have studied these two factors in isolation from one another, so that little is known about their interaction. Furthermore, change programs have considered almost exclusively either one type of influence or the other. Thus, while we suspect that individuals' reasons for smoking will affect what happens when they try to change, few data are available.

The Task Force has concluded that an increased understanding of smoking influences is very important, and that the necessary research is unlikely to occur unless it is encouraged actively. Therefore, the Task Force recommends that such research be given priority, and that mechanisms be developed to ensure that the research will be conducted. Barriers to the necessary research are elaborated in Appendix 3.

RECOMMENDATION 11:
Acquisition by Minors

IT IS RECOMMENDED THAT STUDIES BE CONDUCTED ON HOW CHILDREN ACQUIRE CIGARETTES, AND ON THE EFFECTS OF ENFORCING EXISTING OR FIRMER RESTRICTIONS ON CIGARETTE SALES TO MINORS.

Restrictions on access generally reduce consumption. For example, consumption of alcohol varies somewhat with the number of outlets. Moreover, enforcing severe restrictions on access by young people can reduce their consumption — again witness alcohol.

Thus, enforcing restrictions on sales might be an effective means of reducing smoking in youth. However, it is not known how youth acquire cigarettes. If research confirms preliminary evidence that up to 80% of the cigarettes they smoke are purchased by the smoking children themselves, controlled studies of the effects of enforcing Ontario's *Minors Protection Act* would be indicated.

If enforcement decreased consumption, then low cost mechanisms for achieving better enforcement across Ontario might be investigated.

Research in this area might provide not only a better understanding of how children acquire cigarettes, but also a better understanding of the circumstances under which they begin to smoke. Along with research suggested by the preceding recommendation, this understanding might lead to more effective prevention by means other than restriction of access.

CO-ORDINATION MECHANISM

RECOMMENDATION 12:
Resource Centre for Smoking and Health

A RESOURCE CENTRE FOR SMOKING AND HEALTH SHOULD BE ESTABLISHED TO PROVIDE ESSENTIAL CO-ORDINATION, AND THROUGH ONGOING CO-ORDINATION TO ENSURE THE DEVELOPMENT, DISSEMINATION, AND IMPLEMENTATION OF EFFECTIVE SMOKING MEASURES.

Balance in a smoking program requires extensive co-operation among the principals, and careful co-ordination of program components. The Task Force is persuaded that a Resource Centre for Smoking and Health will be essential in this respect. Thus, it has gone beyond a consideration of policy options to suggest this particular implementation strategy. The primary aim of the Centre would be to ensure development, dissemination and implementation of effective smoking strategies. Towards this end, the Centre would:

1. Actively encourage and facilitate collaboration between researchers and program providers, to make research more relevant to Ontario's present needs, and to improve programming.
2. Stimulate basic research where gaps in knowledge impede development of desired strategies.
3. Act as a clearinghouse for information and program materials.
4. Advise the Minister of Health and others on smoking policy.
5. Ensure consultation services concerning research and evaluation, co-ordination of programming, and training. Such consultation services should use existing resources whenever possible, supplemented by new Centre services if necessary.
6. Ensure availability of appropriate training resources for various program providers.

7. Ensure monitoring of the health status of the population with regard to smoking, and ensure assistance to communities in the development and implementation of parallel systems for regional planning and monitoring.

This recommendation echoes that of the Joint Research Review Task Force, arising from their 1981 *Smoking OR Health in the 80's* conference. It also reflects the views of community organizations expressed in our meetings with them. An effective Centre would strengthen existing co-operation. It would ensure that resources are used efficiently, and that the various organizations complement each other in program development initiatives. Options for funding would include:

1. A time-limited grant from the Provincial Lottery, such as have been available in nutrition and gerontology areas.
2. Allocation of existing resources from within the government or from non-government organizations.

The Task Force is not recommending a specific organization for the Centre. We have limited our role to the identification of what we view as a major co-ordination problem. A carefully developed solution must consider current organizational and resource realities; there are a variety of options.

1. It is essential that the Centre effectively integrate program development and program delivery. Most existing organizations in Ontario emphasize either research and program development, or program delivery, relatively more than the other. Historically, no organization has achieved sufficient integration.
2. The Centre need not be large, and might rely primarily on co-ordination of existing resources throughout the Province to achieve its objectives. On the other hand there must be a minimum level of staffing and operating resources so that the Centre can provide leadership, and necessary activity in those key areas which currently do not have adequate resources, and where additional resources are not likely to be fully and quickly developed by other organizations.
3. The Centre should not be given regulatory powers but rather should gain support and co-operation of governments, organizations, foundations, associations, individual researchers and the like through consultation and advocacy.
4. Centre operations would not all have to be centralized. Many of the activities to be co-ordinated are Toronto-based and a physical presence in Toronto would be desirable for that reason. However, there is significant expertise and activities in such cities as Hamilton, London, Ottawa, and Waterloo. Community interest and initiatives are developing in other regions.
5. The Centre must maintain a degree of autonomy if it is to achieve the necessary balance and co-ordinate diverse vested interests and initiatives. However, formal relationships with other principals in the smoking control area might be desirable.

To achieve full benefit, it is important that the Centre become operational as soon as possible, certainly within one and one-half to two years. To provide co-ordination in the interim, the Task Force also recommends that the Minister of Health establish an Interim Committee on Smoking Research and Program Development. Advice of the Council of Health, and the Task Force on Smoking, should be sought regarding composition and terms of reference. It would facilitate establishment of the Centre, and be responsible for activities which must take place before the establishment. One such activity would be a possible conference on smoking programs to be held just before or after the July, 1983 Fifth World Congress on Smoking and Health meetings in Winnipeg, thus taking advantage of the presence in Canada of international expertise.

PRIORITY OF RECOMMENDATIONS

The Task Force considered the question of which recommendations deserved highest priority. Two recommendations stood out. Recommendation 12, concerning the Resource Centre for Smoking and Health, is key since its co-ordination would provide the underpinnings for all other recommendations, thus increasing the likelihood that a significant overall program effect would be achieved. Recommendation 4, providing for increased tobacco taxation, stands out in two respects. It is not known if other measures might produce a greater long-term effect. However, in the short-term, increased taxation will have the greatest effect on smoking in Ontario. Furthermore, it would be productive of new income which might be used to finance other recommendations.

The Task Force noted both that:

1. The number of recommendations already had been limited, so that all twelve were of highest priority.
2. The importance of a balanced program must be considered paramount.

Thus, the decision was made *not* to assign greater priority to any of the recommendations.

Chapter 6

IMPLEMENTATION

The Task Force terms of reference do not extend to implementation of recommendations. However, the terms of reference have led the Task Force to the appreciation that most important measures in the smoking and health area call for careful bridging from research and program development to the formulation of an integrated smoking program for the Province. The Task Force has had to consider implementation in the development of its recommendations, because the recommendations and their implementation often were interrelated. We believe they cannot and should not be separated. Thus, in this section, some of the most important issues for implementation, and implementation options, are discussed for the interest of those receiving this report and those ultimately charged with implementation of the various recommendations. Discussion relates to various resource needs, co-ordination, community organization, planning and evaluation.

Resources will be needed for the recommended research, for development of the various government initiatives proposed in the Recommendations, and for the presentation of programs at the community level.

Research Resources

Existing human and financial resources potentially are sufficient for most of the proposed research, although co-ordination and redirection of priorities will be necessary in some instances. The Ministry of Health already funds a significant degree of smoking program development research through the contributions programs for Health Care Systems Research, and Public Health Research and Development. In-house funds for additional development work in other areas have been made available in the past on a contractual basis. Other provincial organizations operate relevant research funding programs. Furthermore, the various statutory and voluntary foundations have major commitments to program development funding, much of which currently is done in-house. An explicit priority on recommended smoking research and program development would facilitate funding through all these mechanisms. A concerted effort by both provincial and federal funding bodies might be required to achieve Recommendation 6 and the desired collaboration between researchers and program providers. The large demonstration projects described below also require special effort to ensure adequate, sustained funding. Collaborative research and development funding by the Government and other provincial organizations may prove desirable.

It is important to note that human research resources also must be deployed effectively. The Resource Centre would provide valuable consultation services, for example in the development of research proposals. The new Ontario Health Scientist program also might be used effectively in this context.

Government Resources

Government initiatives will require appropriate allocation of resources within several Ministries. Adoption of goals for a smoking program would be helpful. Specific areas for resource allocation might include the following:

1. Development of recommended regulations and policies will require a variety of efforts. The Ministry of Health has issued previously and promoted guidelines for the establishment of nonsmoking areas. Thus, there already is a basis for development of legislative measures regarding smoking in public places, which can be complemented by the experiences of several Ontario municipalities in this regard. Recommendation 5 suggests discussion with the Federal government regarding a prohibition on tobacco promotion. Finally, in acting on Recommendation 4 and increasing tobacco product taxation, it would be important to meet with tobacco producers to make clear the fact that while major increases in taxes will decrease consumption, producer profits initially can be maintained through increases in wholesale price.
2. Smoking programs for the workplace might start with Project Smoke/less, now being tested by the Ontario Ministry of Health. The Ministry might be encouraged to allocate resources so that this program and others like it might be available to non-Government establishments. The Minister of Health might use his good office to promote such efforts in the private sector by hosting meetings with corporate executives to discuss the advantages of smoking control measures in the workplace.
3. There have not been efforts in the past to ensure that schools develop smoking policies as suggested in Recommendation 7. The Ministry of Education should be prepared to provide whatever advice, assistance and support that might be required to develop and implement policies. It would be important to consult with organizations such as Parent Teachers Associations, the Ontario Teachers Federation and School Boards, the Federation of Student Councils, the Ontario Interagency Council on Smoking and Health, and the Ontario Physical and Health Education Association.
4. Potential problems in the implementation of smoking prevention programs in the schools were identified in the rationale for Recommendation 7. It is recognized that some Ministry of Health and Ministry of Education planning and consultation must accompany recommended program development.

Community Resources

The adequacy of community resources for program implementation will depend on the degree of success in (a) mobilizing existing community resources and (b) achieving a high priority for smoking initiatives. There are resources potentially available. Task Force meetings with community organizations, and the briefs received, clearly indicate an increasing priority for smoking. However, the Task Force mandate did not include assessment of community resources, and

further investigation would be important in planning recommendation implementation.

CO-ORDINATION

The co-ordination functions of the Resource Centre for Smoking and Health have been described. Both (a) intergovernmental and (b) interagency co-ordination are required as well.

Intergovernmental Co-ordination

Other jurisdictions in Canada face the same problems in their development of smoking programs. Their aims and activities are likely to be similar to those of Ontario, and good provincial/provincial and provincial/federal co-ordination would contribute greatly to efficiency and impact. Ontario has an important role to play in collaborative ventures. The needs for co-ordination with respect to restrictions on tobacco promotion, and research funding, have already been mentioned. Overall national co-ordination of smoking programs, and specific co-operation in other areas of common interest, are necessary as well. There currently are major initiatives in Canada, emphasizing the importance of national co-ordination and complementary effort, among governments and other organizations. It also should be remembered that increased smoking initiatives are being seen internationally. Much could be co-ordinated through the World Health Organization, including demonstration projects and evaluation of program components.

Interagency Co-ordination

The ways in which smoking and health organizations will co-operate need to be worked out carefully. The Centre and Interim Committee will plan co-ordination, building on good co-operation already established in this Province. Initially, agencies will need to discuss thoroughly the implications of this Report for their organizations. Subsequent important issues will include:

1. Whether program development activities will be carried out by single organizations, once priorities have been co-ordinated, or in partnership.
2. Whether products will be distributed only by the developing organization, or by others as well.
3. How agencies will continue to receive credit and public recognition for new collaborative initiatives.

COMMUNITY ORGANIZATION

It has been noted that the need for balance includes several dimensions contrasting centralized research and program development with local initiative. Most empirical evidence concerns *what* should be done about smoking in the community and *why* these measures should be effective. It is equally important to ask *how* carefully developed programs can best reach and be implemented in

the community. Models and knowledge of community organization are emerging. It is crucial that this body of knowledge is linked appropriately with the smoking programs developed. Research about smoking programs and knowledge of community organization must be considered of equal importance if we take into account:

1. Successful experience in other jurisdictions.
2. The noteworthy success of controlled research projects such as the Stanford Heart Disease Prevention Project in the United States, and the North Karelia Project in Finland.
3. Systematic reviews of health promotion more generally.

The integration of carefully researched program development and community organization techniques must, we believe, occur at every stage in the development process. Otherwise the most effective programs will be lost to the people for whom they were intended. The Task Force, therefore, advocates a limited number of well funded demonstration projects as a means of achieving the aims suggested by Recommendations. This approach would permit an empirical approach to program development and sensitivity to the needs of communities.

These demonstration projects will not be easily designed. We have already referred to the need to develop many programs centrally and to standardize them in order to make them effective. That need will have to be carefully blended with the need for communities to make the program "theirs" and for existing health organizations, health workers and community leaders also to feel ownership. It is clear that quality consultation, both in formulating appropriate demonstration project models and in making such integration work, will be one of the key resources required of the Resource Centre for Smoking and Health.

There are different approaches to community organization. Given the nature of smoking programs and the Ontario context, the Task Force favours approaches which utilize the existing health care system, health organizations, and community resources as much as possible. However, concern on two scores has been noted:

1. Many programs may need to be centrally developed and standardized to be effective.
2. Infusion of new resources should be available when clearly defined needs are identified.

A final issue for community organization concerns research strategy. The *"how"* of community organization is as important and appropriate a research topic as the more traditional "what" and "why". Findings in each area are interdependent. For example, the most effective program at a community level may vary as a function of community organization principles. Demonstration projects must be sensitive to these complementary research questions, and incorporate formative/process and implementation evaluation strategies which shed light on critical community organization issues.

PLANNING

Extensive planning will be necessary for implementation of Task Force recommendations. The Interim Committee should begin development of a five-year plan, which would be overseen by the recommended Resource Centre for Smoking and Health.

The plan should include:

1. Measurable objectives based on a statement of general goals such as those provided above.
2. Priority strategies leading toward achievement of these objectives.
3. A plan for addressing the various Recommendations over the five-year period.
4. Preferred mechanisms for implementing the various strategies.

Phasing of the various elements should be sensitive to:

1. The need for planning data on the community level to set priorities and select strategies consistent with local preferences.
2. Instances where prerequisite research must be completed before program development.
3. Mobilization of community and political will for action before measures are introduced.

The Task Force believes that all twelve Recommendations could be implemented within five years. Increased taxation would result in decreased consumption within one year. A significant combined effect for the other Recommendations should be seen within five years of implementation, or sooner. The Resource Centre for Smoking and Health should be established within two years to achieve its full impact.

EVALUATION

The Task Force strongly advocates the inclusion of evaluation strategies as an integral aspect of all program and policy components. Population monitoring is necessary for needs assessment, monitoring and program refinement:

1. For needs assessment and planning, data are required at a community level to (a) describe smoking behaviour in potential target groups, (b) characterize each subpopulation with respect to health status, attitudes towards smoking and a variety of factors which affect program impact, (c) point to preferences for alternative smoking strategies, (d) indicate desire for programs and readiness for change, (e) outline the nature of community resources, etc. The Centre should stimulate a demonstration project to develop a community monitoring system.
2. Regular monitoring of smoking behaviour and other measures of program impact is required to assess the cumulative effects of smoking initiatives.

3. More specific evaluations of program effects on the community are needed to provide a basis for changing programs to optimize their effects.

Evaluative research clearly is basic to many of the Recommendations. It is important both that individual measures be evaluated (e.g. smoking change in primary care, enforcement of restrictions on sales), and that the overall effect of all efforts in a community be studied. The proposed large-scale demonstration projects should be designed to evaluate the impact of alternative comprehensive programs in different communities.

Chapter 7

CONCLUSION

This report makes varied recommendations. Appendix 1 provides a description of the Ontario context for these Recommendations. Organizations contacted by the Task Force are listed. The Appendix also includes descriptions of current activity in Ontario both by these organizations and by individual researchers.

Appendix 2 provides details of smoking trends in Ontario. Appendix 3 includes the analyses of the scientific literature which provide the bases for Task Force recommendations in the areas of restrictions on smoking, marketing, and prevention and change programs.

APPENDIX 1

SMOKING AND HEALTH IN ONTARIO: ORGANIZATIONS AND CURRENT STATUS

The aim of this Appendix is to characterize current activity related to smoking and health in Ontario, to provide a background for the reader of the Task Force Report. There are three sections. The first, *program activity,* describes various legislative, policy, program and co-ordination measures in the Province. It should be noted that because of the amount and diversity of the activity it was impossible to document it all; an attempt has therefore been made to identify major activity areas. The second section summarizes *smoking research.* The third, *Task Force consultation,* outlines the steps taken by the Task Force to involve community organizations in its work.

This review of current activity in the smoking field was compiled by reviewing the briefs submitted by community groups to the Task Force concerned with policy and programs the findings of the work groups within the Task Force, and with the assistance of many individuals both in the Task Force and without, who contributed their experience and knowledge of current activities to the Report.

PROGRAM ACTIVITY

Legislation

Most of the activity relating to smoking legislation is taking place at the municipal level. In response to a request from the Ontario Interagency Council on Smoking and Health, in January 1979, the Honourable William Davis stated that "the Government (of Ontario) does not intend to adopt Provincial anti-smoking legislation at this time, but will continue to endorse the enactment of local by-laws to control smoking in specific areas".

A general clause in The Municipal Act has been used by a number of municipalities as authority to enact non-smoking by-laws affecting a broad range of public places. This authority to enact comprehensive non-smoking by-laws has been questioned and a recommendation was made by the Minister of Health to the Minister of Intergovernmental Affairs that The Municipal Act be amended to clarify the rights of municipalities in this regard. In 1978, Cabinet decided not to amend the Act, taking the view that municipalities already had the right to pass by-laws regulating smoking. However, there is still reluctance within some municipalities to pass by-laws without specific enabling legislation. Unincorporated areas, which cannot avail themselves of the authority of The Municipal Act, would appear to have no competence to pass non-smoking

bylaws. Furthermore, municipalities cannot regulate buildings and other properties used for provincial and federal government purposes.

Cities where legislation exists include Barrie, Hamilton, Kingston, Kitchener, Mississauga, Ottawa, Sarnia, Sault Ste. Marie, City of Toronto, Waterloo and Windsor. The Non-Smokers Rights Association has been particularly active in some cities recommending and lobbying for legislation. Created in 1976, this organization has been consistent in its efforts to regulate smoking in public places by applying pressure on elected officials, informing the public of the issues involved in smoking legislation and the stands taken by their elected representatives. The Association has sought to rally the concerned and committed to appear when votes are taken. It continues to offer expertise and support to the increasing number of municipalities that now are exploring non-smoking legislation.

There is little legislation within other Ministry jurisdictions related to smoking as a health issue, although smoking as it relates to fire safety is found in the Public Hospitals Act (Ministry of Health), in regulations regarding handling of fuels (Ministry of Consumer and Commercial Relations) and in the Fire Marshall's Act (Ministry of the Solicitor General). The Minors' Protection Act, administered by the Ministry of the Attorney General, provides that no person shall sell cigarettes to a child under 18 (unless it can be determined that they are for a parent's use). Fines for this offence range from $2 to $50. Although this legislation has been in existence for many years, charges or convictions under this Act have been virtually non-existent.

The Ministry of Health has not favoured provincial legislation to date but has preferred to support educational efforts of a wide variety, establishing guidelines as a means of gaining public co-operation in the limitation of smoking. In 1976, "Guidelines for Establishment of Non-Smoking Areas" was issued. A Ministry of Health task force suggested a self regulating and voluntary approach to the control of smoking in selected areas such as hospitals, theatres, transportation and eating facilities, schools and offices. While guidelines do not carry the same weight as law, the Ministry of Health action did acknowledge the seriousness of passive smoking as a health issue, and more generally represented recognition as a health issue as well as a safety issue. The 1976 task force recognized that the effectiveness of guidelines in providing a smoke free environment depended on a number of factors, not the least of which was the public demand for non-smoking areas. The guidelines approach may have been a first step in assisting industry, government and individuals to establish non-smoking as the normal social behaviour.

Two Ministries exhibit a pro-tobacco stance. The Ministry of Agriculture has a policy supportive of tobacco farming, although no special grants are given. In 1979, cash crops grossed more than $200 million. The Ministry of Revenue is responsible for levying and collecting the Ontario Tobacco Tax, a tax imposed to obtain revenue and not as a deterrent to smoking. Projected revenue in Ontario for the year 1982 is $343 million, reflecting a 1.65¢ tax per cigarette (Ontario Budget Report, 1981).

The Federal revenue from tobacco is obtained in the form of an excise tax, excise duty, and 12% Federal tax. In Canada, of the more than $900 million collected in 1979, $322 million is estimated to have come from Ontario. The total revenue in 1982 for all forms of tobacco tax in Ontario is estimated to be $665 million.

The reluctance of provincial and federal governments to act strongly against tobacco becomes understandable in view of the enormous revenue generated.

There is no legislation concerning tobacco advertising, labelling and hazardous component listing. Voluntary action has been taken by the tobacco industry to forestall legislative action by governments. The Health and Safety Act administered by the Ministry of Labour contains no reference to smoking, although an interest group concerned about synergistic risk exists within this Ministry. On site regulation of smoking remains within the control of individual companies.

Policy and Program

Policy should guide organizations in the development of programs and the pursuit of activity. However, of twenty organizations with a stated interest in smoking responding to an informal survey conducted by the Task Force in February, 1982, only eleven have established policies. Often there is little relationship between stated policies and the program activity which takes place within the organization. It seems that policy statements do not reflect activity well — sometimes activity is greater than might be expected, sometimes less.

The policy statements in Table I (pg. 44–45) summarize those reported in the Task Force survey. They reveal some surprises relating to the intentions of the organizations. Many voluntary and professional organizations, although supportive in principle of a total ban on advertising, have not played an advocacy role in pressuring government to enact such legislation. Both the Canadian Medical Association and the Ontario Lung Association and its local associates, have adopted as their own policy statements, recommendations of the WHO Expert Committee on Smoking Control (1979). Both the Ontario Hospital Association and the Ontario Medical Association support control of smoking in hospitals. Only the Canadian Public Health Association identified the health professional as an exemplar and educator in its policy statements. Of the eleven responding organizations, only four had successfully limited smoking within their own meetings. Despite vigorous program activity by the voluntary sector and government, only five organizations stated support for educational programming.

Program Activity — The Schools

The Ministry of Education establishes guidelines for curriculum development at the local level. It suggests that smoking education be given heavy emphasis in grades four to eight. The Canadian Cancer Society has produced a series of activity-oriented kits that explore the issues surrounding the decision to smoke. Based on a decision making model, *The 4–6 Kit* presents information about fitness and the cardiovascular and respiratory systems, and how smoking influ-

ences them. Using puzzles, games, exercises and experiments, children are encouraged to make their own decision. *The Kit,* for grades 7–8, continues to provide information about the immediate effects of smoking as well as introducing peer group pressure and advertising as influential factors in the decision to smoke. Each comes with a teacher's guide and is made available, free of charge, to schools. Distribution of the kits is carried out locally by Canadian Cancer Society volunteers, so that not all children have access to the material. The material is taught by the classroom teacher who may not be committed to non-smoking nor to the value of such programming in the schools.

The Ontario Lung Association has developed a biomonitoring program that has been especially popular with high school students. Four machines are used to assess the physiological effects of tobacco smoking and of carbon monoxide. The equipment includes a carbon monoxide analyzer which measures carbon monoxide in exhaled breath and ambient air, a cardiotachometer which measures pulse and heart rate, a digital thermometer which measures skin temperature and a hand tremor tester which measures hand steadiness. Four complete lessons have been developed that combine demonstration and experiments to assess carbon monoxide levels in the environment. The biomonitoring program can have a dramatic effect on students because it records their own levels instantaneously — its feedback is personal and immediate. One cigarette does make a difference in the readings!

One particularly innovative approach to school-based smoking education was a children's theatre presentation sponsored by the Ministry of Health. A dramatic presentation was prepared to promote non-smoking and was made available to many schools throughout the province.

Adult Program Activity

The Ontario Lung Association has been in the vanguard, providing smoking withdrawal courses to over 3,000 people in 1981. Independently or jointly with organizations like the Seventh Day Adventists, they provide inexpensive group courses using films, self help guides and discussion. The Association distributes two self help courses widely, "Do It Yourself Quit Smoking Course" and the American Lung Association's "Freedom from Smoking" self management cessation course.

The desire to quit has led to the development of a number of private (and expensive) withdrawal programs as well as less traditional approaches to behaviour change such as hypnosis, acupuncture and aversion therapy.

"Time to Quit" is a television-delivered smoking withdrawal program that may reach more smokers than any traditional program can. Developed by the Canadian Cancer Society and Health and Welfare Canada, the program contains a self help booklet to be used in conjunction with the television component. It is currently being field tested.

Smoking and the Workplace — Project Smoke/Less

Project Smoke/less was a six month pilot project prepared by the Health Promotion Services of the Ministry of Health. Its purpose was to develop a model

smoking control program in a work setting using a committee representative of the employees in one government building. The project was designed to encourage, assist and support smokers' efforts to co-operate. The theme was courtesy, consideration and co-operation. The name and logo of the program were widely displayed and promoted. Areas designated as non-smoking locations were well respected and a decrease in smoking was noted in immediate work locations. The majority of employees involved in the project wanted it to continue and recommended its adoption at other government locations as well as by business and industry.

National Non-Smoking Week (NNSW)

National Non-Smoking Week is a major project of the Canadian Council on Smoking and Health and is sponsored in Ontario by the Ontario Interagency Council on Smoking and Health. Occurring annually in January, it welcomes co-operation at the community level of all individuals and groups with an interest in smoking. Last year, over 33 groups sponsored NNSW events. The highlight of the week is Weedless Wednesday when smokers are urged to give up their cigarettes for one day. The day is a media event, with mayors, newspaper editors and local leaders all participating. The theme of the week has been "join the majority — be a non-smoker". This year the target group for activity was preschool children, their parents and teachers, and prenatal families and their instructors in support of the Federal government initiative, "Towards a Generation of Non-Smokers". An extremely wide range of activities takes place under the broad umbrella of NNSW. This year, for example, presentations were made in schools, shopping malls, hospitals, industry, on radio, television and in newspapers throughout the province. Cessation clinics were offered. Special seminars were prepared for day care nursery teachers on their role in smoking education. Even a baby's shirt was prepared with the logo "Towards a Generation of Non-Smokers" for distribution at prenatal classes in one area. NNSW demonstrates that diverse organizations can co-operate at the community level to control smoking.

A Community Based Program —
The City of Toronto Tobacco Reduction Program

The Health Advocacy Unit of the City of Toronto Department of Public Health has developed a program that is aimed at decreasing the use of tobacco by Toronto residents. Its main effort will be directed towards encouraging young people not to start smoking. The prime target group is children aged eight to eleven, although other groups will be included. The program recognizes the need to make societal changes to support non-smokers. The community will be involved in the planning of a well co-ordinated, multi-faceted, anti-smoking program that is to extend over a 20-year period. Existing programs and services will be utilized. It is planned to start in three selected areas and then to expand into many communities within the city. Media support and program recognition by use of logo and theme have been assured.

Towards a Generation of Non-Smokers

"Towards a Generation of Non-Smoking Canadians" is a goal around which a major multi-agency program is to be built over the next five years. It is spearheaded by the Federal Government. The primary focus of the program will be to discourage youth from starting to smoke, although role models such as parents or teachers will also be addressed. An exciting feature of the project is Health and Welfare Canada's commitment to work at the community level. A preliminary conference was held in 1982 to enlist the support of provincial governments and voluntary agencies. A media campaign is underway under the Generation logo and theme. Support for voluntary agencies will be given to help them shape effective smoking control programs that will support the Generation theme and be collaborative in nature.

Efforts at Collaboration — The Ontario Interagency Council on Smoking and Health

Formed in 1975, the Ontario Interagency Council is composed of 22 member agencies who share the belief that smoking is the leading cause of preventable death and disease in the province. Its objectives are a) to promote and co-ordinate programs on smoking and health carried out by various agencies in the province of Ontario, b) to act as an information exchange or clearing house for programs in the province, c) to encourage joint action among agencies in promoting legislation and education, and d) to review and evaluate existing programs and to stimulate planning of new programs. Its most visible project has been NNSW which it co-ordinates provincially. Fifteen local Interagency Councils exist, many of them functioning only with respect to the National Non-Smoking Week. Some have been actively involved in municipal by-laws passage. Perhaps the greatest strength of the Interagency Council is the value of the informal relationships that have developed. They enrich the programs and policies of the member agencies by establishing networks of individuals with special skills or interests that may be utilized in all phases of program development and implementation. Special mention should be made of the Ministry of Health support and funding of various co-operative programs, conferences and projects carried out by the Interagency Council. In the last few years, these included support for National Non-Smoking Week, a conference on Women and Smoking, and a Youth Exemplar Conference.

Future Directions

There is a great sense of anticipation when the future of smoking control is discussed. Agencies and governments feel they are on the threshold of making dramatic new gains. The Federal initiative "Generation" has mobilized widespread support and enthusiasm creating a climate for renewed optimism and commitment. The Ontario Heart Foundation is increasing its effort in public education with the development of a "life skills" program that has broad application to promote health lifestyle for Canadians. It is taking a more active role in social action issues to act as an advocate for non-smoking legislation. It is ex-

ploring creative ways of teaching about smoking including use of peer instruction.

The Canadian Cancer Society is increasing its emphasis on the mass media to set up a positive social climate for non-smoking. It has recognized the value of health professionals as exemplars and health educators and has produced new materials to aid physicians and nurses as they counsel patients. The Society is exploring its role in discussing smoking in the workplace where synergistic risks occur. Existing materials are being revised to respond to evaluations from the field and new knowledge about program effectiveness.

The Ontario Lung Association will continue to offer smoking withdrawal clinics and support to the many residents of Ontario.

SMOKING RESEARCH

(Summary of a 1981 questionnaire survey of Ontario researchers)

The information contained in this section was assembled by Dr. R.C. Frecker and Dr. M.J. Ashley during late 1980 and early 1981 for presentation to a research workshop following the Conference "Smoking OR Health in the 80's".

The data presented have been collated and summarized from responses to a questionnaire sent to all known smoking researchers in Ontario. An initial mailing was made to 24 investigators previously surveyed by Dr. R.M. Gilbert, to the Offices of Research Administration of fifteen Ontario universities, and to 27 granting, research and voluntary organizations. In addition to being asked to complete a questionnaire relating to their own activities in conducting or supporting research relating to smoking and health, these sources were asked to supply the names of individuals (not named on an enclosed list) known or thought to be engaged in active research. Other researchers were located from the U.S. Department of Health and Human Services "1980 Directory of Ongoing Research in Smoking and Health", lists provided by the Federal Granting Councils, all levels of Government in Canada, Statutory Foundations (Ontario), and voluntary or private bodies. In all 152 investigators were identified from whom 70 completed questionnaires were elicited using, where necessary, follow-up mailings and personal phone calls to ensure that no active researchers were missed.

In all, 48 principal investigators were contacted who, in association with 22 co-investigators, were conducting 75 separately-identified projects with funding from 40 discrete sources. For 50 of these projects financial details were supplied for the "current year" (as of January 1, 1981). A number of projects were either "complete" or "in planning stages" as of this date and no financial information was available. As of January 1, 1981 the "current year" funding, from all sources, for research in Ontario related to smoking and health was $2,741,841.

The bulk of research was being conducted by investigators (44 (65%)) located at six of Ontario's universities (Toronto (20); Waterloo (9); McMaster (8); Queen's (4); Ottawa (4); Western (1)). A further 16 (or 23%) were located in the Ontario Provincial Government (9), the Federal Government (6), or the Toronto Municipal Government (1); and in various hospitals (3); voluntary agencies (3), or private companies (2) (residual 11%).

The largest single group of investigators (20) categorized themselves as Biological Scientists, while there were 15 Behavioural Scientists, 6 Social Scientists, 11 Educators, 1 Legislator/Policy Maker, 6 Clinical Practitioners, and 11 "others". Of these 70 investigators, some 23 stated smoking to be their primary research interest, while for 47 (or two-thirds) smoking research was a secondary or less important interest. The mean per cent of work week spent by all 70 investigators on research varied from 19.0 to 61.5% (highest for Behavioural Scientists, lowest for Clinical Practitioners) with an aggregate of 30.7 "full-time equivalent" (FTE) researchers. A total of 12.7 FTE "smoking researchers" were identified in aggregate.

The seven Behavioural Scientists interested primarily in smoking research spent an average of 86.4% of their work week on research, and 50.7% of their work week on smoking research (or some 58.7% of their research time). The seven Educators interested primarily in smoking spent 70.0% and 15.7% of their work week on research respectively. Figures for other major groups were Biological Scientists (4) 70% (35.5%); Social Scientists (1) 100% (80%); Clinical Practitioners (1) 75% (10%); and, Others (3) 70.0% (50.0%). These researchers accounted for 8.47 of the total of 12.7 FTE smoking researchers in Ontario. The other 4.23 FTE smoking researchers in Ontario come from that group whose research interests were not primarily smoking. These were 47 of the total of 70 investigators who spent a proportionately smaller part of their effort on smoking research.

The distribution of the 70 responding investigators by profession was as follows:

Psychology	(23)
Medicine	(14)
Epidemiology	(12)
Education	(9)
Chemistry	(4)
Physiology	(4)
Pharmacology	(2)
Sociology	(2)

However, when asked not their own profession, but that profession to which their research on smoking most related a different picture emerged:

Medicine	(28)
Education	(6)
Psychology	(3)
Nursing	(3)
Agricultural Science	(2)
Engineering	(1)
Law	(1)
"No Response"	(26)

Of the $2,741,841 "current year" funding being spent on smoking-related projects the breakdown by functional category was as follows:

Category	*Projects*	*Funding*	*% of Total*
Distribution in Populations	4	105,000	3.8
Consequences of Smoking	24	1,244,083	45.4
Treatment of Smoking	23	987,000	36.0
Determinants of Smoking	14	174,300	6.4
Prevention of Smoking	10	231,442	8.4

The same funds divided into the categories of the U.S. Office on Smoking and Health (Department of Health and Human Services) are shown in the following Table.

Category	*# of Bank*	*Projects*		*Level of Funding*	
		#	*%*	*Dollar*	*%*
Agriculture	11	1	1.3	20,000	0.7
Chemistry	4	2	2.7	166,200	6.1
Pharmacology/Toxicology	9	10	13.3	97,300	3.6
Mortality/Morbidity	8	2	2.7	105,000	3.8
Neoplastic Diseases	6	4	5.3	138,133	5.0
Non-Neoplastic Respiratory	1	7	9.3	728,750	26.6
Cardiovascular Diseases	5	4	5.3	150,000	5.5
Pregnancy and Infant Health	10	4	5.3	40,000	1.5
Other Diseases/Conditions	12	3	4.0	17,000	0.6
Behavioural	2	17	22.7	692,800	25.2
Educational	3	8	10.7	453,442	16.5
Smoking Cessation Methods	7	13	17.4	133,216	4.9
Tobacco Manufacturer	–	0	–	–	–
Tobacco Economics	–	0	–	–	–
Bills and Legislation	–	0	–	–	–
Other	–	0	–	–	–
Totals	–	75	100.0	2,741,841	100.0

The project funding status as of January 1, 1981 for the 75 projects included in this summary was given as "completed" for 20 projects, "underway" for 44 projects, and "planned" for 11 projects. Funding details were given for 50 of these projects. The majority of funding was for projects which were said to be "underway" ($2,293,841 or 83.7%). Projects "completed" accounted for $417,000 (15.2%); and projects "planned" for $31,000 (1.1%).

A variety of large projects ($100,000 or more "current year" funding) were reported. Six of these accounted for 60.9% of total funding or $1,669,781.00, while the remaining 44 projects for which funding information was given accounted for the remaining 39.1% or $1,072,060. The mean funding levels for these two categories was $278,297 per project versus $24,365 per project.

Grants-in-aid of research accounted for the largest share of research support ($1,887,823 for 29 projects). In-house budgets accounted for $467,000

shared among 17 projects; demonstration project funding for three projects totalled $220,818; while other sources accounted for $166,200.

Ontario Provincial Government Departments and Lottery monies provided in aggregate the largest single funding source ($771,818), followed by Federal Government Departments ($695,000), National voluntary organizations ($506,796), the Federal Granting Councils ($277,675), private foundations and industry ($178,500), and the Provincial statutory foundations ($129,552). These six sources accounted for 93.3% of all research funding ($2,559,341). The other 6.7% came from outside Canada ($90,000), from Provincial and local voluntary organizations ($51,500), Municipal Government agencies ($36,000), and from agencies of other Provinces ($5,000).

TASK FORCE CONSULTATION

From its inception, the Ontario Council of Health Task Force on Smoking recognized the importance of community group participation in its deliberations. It recognized that much program activity had taken place at the community level and it sought to ensure that Task Force thinking would reflect community input.

A letter was sent by the Task Force on Smoking to forty-nine Ontario groups interested in smoking and health issues. It requested input from these groups, encouraging them to submit a brief if they had views or information to share with Task Force members. Of the twenty-three who responded, eight acknowledged receipt of the letter and indicated their support for the Task Force. The fifteen remaining submissions ranged from a very brief description of the organization's activities in the area of smoking, to specific recommendations to the Task Force regarding program and policy options. Those groups who did not respond were telephoned to confirm that no brief was forthcoming.

Community groups who responded to the invitation to comment on activities of Task Force, and on their organization's interest and involvement in smoking included:

Association of Teachers of Physical and Health Education
Canadian Cancer Society — National Office
Canadian Cancer Society — Ontario Division
Canadian Council on Smoking and Health
Canadian Life Insurance Association
Canadian Medical Association
Canadian Nurses Association
Canadian Public Health Association
College of Family Physicians of Canada, Ontario Chapter
Health Advocacy Unit, City of Toronto
Health and Welfare Canada, Health Services and Promotion Branch, Child and Family Health
Health Care Research Unit, University of Toronto
Ontario Cancer Treatment and Research Foundation

Ontario Dental Association
Ontario Heart Foundation
Ontario Hospital Association
Ontario Lung Association
Ontario Ministry of Education
Ontario Pharmacists Association
Ontario Physiotherapy Association
Ontario Public Health Association
University of Ottawa, Department of Family Medicine.

The Task Force believed that dialogue with community groups was an asset to its deliberations. Three meetings of the Task Force on Smoking were arranged with community groups, to address the specific topics of:

a) Restrictions on Smoking
b) Prevention and Cessation Programming, and
c) Marketing of Tobacco.

The objective of these meetings was to develop a more thorough appreciation of community perspectives on these three issues, and to open lines of communication between the Task Force and community leaders in the smoking and health field. Invitations were issued to those organizations who had submitted responses to Task Force requests or who were thought to be especially influential in the smoking and health field. Although few responded, those who did participate did so enthusiastically and with much benefit to the Task Force.

Community groups who participated in group discussions with the Task Force included:

Addiction Research Foundation
Health Advocacy Unit, City of Toronto
Non-Smokers Rights Association
Ontario Heart Foundation
Ontario Hospital Association
Ontario Medical Association
Ontario Ministry of Education.

TABLE I

Policy Statements	*Number of Organizations Supporting*
Marketing Issues	
a) support a total prohibition of all forms of tobacco advertising	5
b) urge that upper limits be established for appropriate emission products of cigarettes. Limits should be lowered as rapidly as possible	2
c) promotion of export tobacco should be discouraged	2
d) sale of tobacco products should be prohibited on hospital property	2
Restriction Issues	
a) support establishment of non-smoking as the normal social behaviour in public places	4
b) prohibit smoking at their own meetings	4
c) support all measures that reduce the risk of health hazards from tobacco products	3
d) urge government to recognize synergistic risk in certain industries and to eradicate smoking from these areas, introducing legislation if required	2
e) hospitals should ban smoking in patient care areas and smoking by doctors should be declared improper and all physicians should prohibit smoking in their office area	2
Program Issues	
a) support educational programs that inform the public of dangers of smoking	5
b) smoking should be discouraged especially in the young	3
c) provide technical support by production, distribution and funding of educational materials	1

Policy Statements	*Number of Organizations Supporting*
Program Issues (cont'd)	
d) provide differential life insurance to smokers and non-smokers	1
e) discourage smoking to promote health and reduce health costs	1
f) support development of a comprehensive national program of research, education, treatment and scientific evaluation designed to discourage the commencement or continuation of smoking	1
g) recognize the important role of health professionals as exemplars and health educators	

APPENDIX 2

SMOKING TRENDS IN ONTARIO

The extent of smoking in Ontario has been changing over the past two decades. These trends are not uniform, but rather vary with gender, age and socioeconomic status. Trends for the overall number of smokers in Ontario suggest one picture; a consideration of how much the individual smokes leads to a different conclusion. For the most part, trends in Ontario parallel those elsewhere in Canada and throughout the industrialized world. However, regional and national variation also occurs.

Most of the data in this Appendix come from the National Labour Force Survey. For the most part, similar conclusions probably could be reached whether Labour Force Survey or alternative data were used. However, comparisons across surveys also suggest considerable variation: for example, there are differences between survey data collected for the Canada Health Survey and the Labour Force Survey, despite similar questions and sampling periods. Thus, some caution must be exercised in interpreting trends. General trends which are consistent across years, age, gender and socioeconomic status are quite stable. In contrast, finer discriminations may be less reliable, for example the joint effects of gender and socioeconomic status. Labour Force Survey data were chosen because they provide the only source of comparative information over several years for different regions in Canada, and because they have the general strength of sound survey methods.

HOW MANY PEOPLE IN ONTARIO SMOKE?

Fewer than one-third of Ontarians fifteen years of age and over smoke regularly. In 1979 the prevalence of regular smoking was 31.1%, a decline of almost one-quarter in the last fifteen years, as seen from Table 1. The prevalence of smoking has declined steadily since 1965, but not equally in males versus females.

The prevalence in males initially was much greater (52.0% for males in 1965, versus 31.1% for females). A sharp decline in male smoking has reduced the prevalence from 52.0% to 34.4%. The degree of change is much less for females (31.1% in 1965 versus 27.9% in 1979), but the absolute level of smoking is still less for females than for males.

The prevalence of regular smoking in both males and females in Ontario is lower than the corresponding rates for Canada as a whole (Figure 1) and for most other regions of the country (Tables 2 and 3).

ARE THE TRENDS SIMILAR FOR ALL AGE GROUPS?

Males and females show somewhat different trends across age groups over time. For males, the pattern is consistent — all age groups show reductions in number of smokers (Table 4). However, for females the pattern is more complex. Table 5 shows that smoking among women ages 15–19 has increased since 1965, although rates have been stable in recent years. There also is a greater prevalence of smoking in the 65+ age group. These two exceptions presumably reflect different phenomena. The increased smoking among young women suggests a greater rate of smoking onset and need for smoking prevention. While there are a variety of possible explanations for the apparently greater smoking prevalence in the 65+ age group, there are no obvious program or policy implications.

A comparison of the rates of regular smoking in male and female teenagers (15–19) and young adults (20–24) indicates strikingly different patterns (Figure 2). Indeed, among teenagers, regular smoking in 1979 was more common in females than in males. In summary, rates in both teenagers and young adults now are comparable for both sexes.

HOW HEAVILY DO SMOKERS SMOKE?

Table 6 shows the overall prevalence of smoking separated to show whether the smokers can be considered "light" (fewer than ten cigarettes a day), "moderate" (smoking an average of 11–25 cigarettes per day), or "heavy" (more than 25 per day). While in 1979 there were only half the light male smokers that there had been in 1965 (5.5 versus 11.0), and many fewer moderate smokers (22.9 versus 35.4), there was little decline in the prevalence of heavy smoking. Figure 3 depicts these changes graphically.

In females, there also was a marked decline in light smoking, but no decrease in the prevalence of moderate smoking, and an *increase* in the rate of heavy smoking.

In sum, an optimistic conclusion can be drawn from a consideration of the overall prevalence of smoking — there are almost one-quarter fewer smokers than there were in 1965. However, these changes have occurred amongst lighter smokers. There are now more heavy smokers than there were in 1965. The reasons for these patterns are not all clear. Some of the issues are discussed in Appendix 3B. For example, cigarettes on average contain less tobacco by weight than they did fifteen years ago. The average tar and nicotine delivery has also decreased. However, the point remains that the optimism suggested by decreased prevalence must be tempered by concern with these troubling trends.

HOW DOES SOCIOECONOMIC STATUS RELATE TO SMOKING?

In males, the relationship between prevalence of regular smoking, and socioeconomic status, is quite clear: the more educated the male, the less likely

he is to smoke. The pattern fo- females appears to differ. Both the least educated and those with university degrees are less likely to be smokers. The highest rates are among those with some high school education (Table 7).

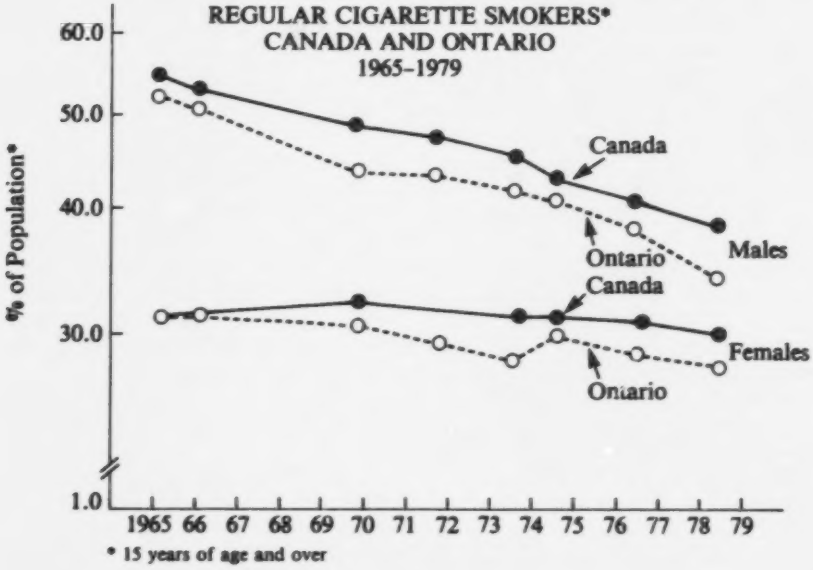
TABLE 1

Percentage of regular cigarette smokers in population 15 years of age and over, Ontario, selected years, 1965–1979

	1965	1966	1970	1972	1974	1975	1977	1979
Males	52.0	50.3	44.3	43.8	41.9	40.6	38.2	34.4
Females	31.1	31.5	30.7	29.6	28.4	30.1	28.8	27.9
Both Sexes	41.4	40.8	37.4	36.6	35.1	35.3	33.5	31.1

FIGURE 1

Regular Cigarette Smokers* Canada and Ontario 1965–1979



* 15 years of age and over

TABLE 2

Percentage of regular cigarette smokers in male population 15 years of age and over, by province, selected years, 1965–1979

	1965	1966	1970	1972	1974	1975	1977	1979
Atlantic Region	53.4	53.6	50.7	48.0	46.8	44.5	43.5	40.4
Quebec	64.2	63.8	59.0	57.1	54.9	50.4	47.8	47.4
Ontario	52.0	50.3	44.3	43.8	41.9	40.6	38.2	34.4
Prairie Region	48.6	46.5	43.9	42.0	40.8	39.5	37.9	36.0
British Columbia	47.8	48.1	44.0	41.8	37.9	39.2	34.0	33.2
Canada	54.6	53.6	48.9	47.4	45.3	43.3	40.8	38.6

TABLE 3

Percentage of regular cigarette smokers in female population 15 years of age and over, by province, selected years, 1965–1979

	1965	1966	1970	1972	1974	1975	1977	1979
Atlantic Region	27.9	28.8	30.5	29.8	30.0	30.3	32.5	30.1
Quebec	32.2	33.4	35.8	37.2	36.1	34.6	35.5	34.6
Ontario	31.1	31.5	30.7	29.6	28.1	30.1	28.8	27.9
Prairie Region	29.4	30.3	31.2	31.0	31.2	29.9	29.8	29.8
British Columbia	34.8	36.5	32.8	33.3	30.6	30.3	28.8	26.9
Canada	31.2	32.1	32.4	32.4	31.5	31.4	31.1	30.1

TABLE 4

Percentage of regular cigarette smokers in male population by age groups, Ontario, selected years, 1966–1979

Age group	1966	1972	1974	1975	1977	1979
15–19	29.4	30.4	26.5	22.2	24.5*	18.9
20–24	57.6	47.8	51.0	40.8	42.0	39.4
25–44	57.7	50.4	47.7	49.7	44.7	39.8
45–64	54.6	45.4	43.6	42.6	38.9	36.8
65+	31.9	28.2	24.3	23.9	25.3*	21.9
Total 15 years and over	50.3	43.8	41.9	40.6	38.2	34.4
Total 20 years and over	53.6	46.0	44.4	43.5	40.4	36.7

* High sampling variability

TABLE 5

Percentage of regular cigarette smokers in female population by age groups, Ontario, selected years, 1966–1979

Age Group	1966	1972	1974	1975	1977	1979
15–19	17.6	23.1	22.7	24.2	22.2*	22.3
20–24	42.9	37.3	35.1	33.1	36.7	34.6
25–44	40.2	34.7	34.3	36.1	33.6	33.1
45–64	32.4	31.6	29.0	31.9	29.5	29.0
65+	7.8*	9.7*	9.1*	12.0	12.5*	10.7*
Total 15 years and over	31.5	29.6	28.4	30.1	28.8	27.9
Total 20 years and over	33.5	30.6	29.2	31.0	29.7	28.7

*High sampling variability

FIGURE 2

Percentage of Regular Cigarette Smokers Among Teenagers and Young Adults
Ontario, Selected Years, 1966–1979

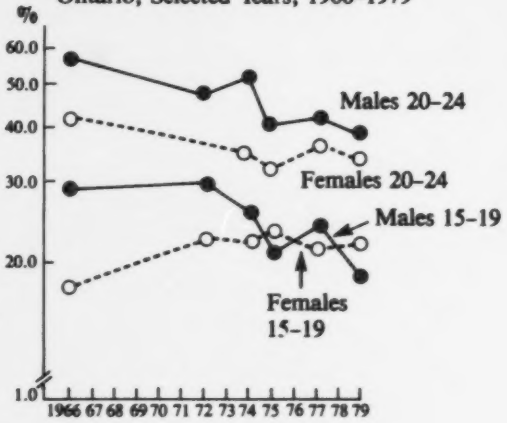


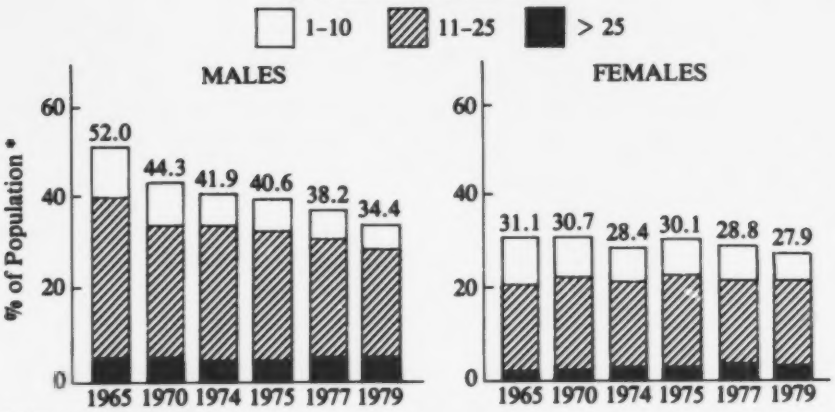
TABLE 6

Percentage of regular cigarette smokers in population 15 years of age and over, by number of cigarettes smoked per day, Ontario, selected years, 1965–1979.

Cigarettes per day	*Males* 1965	1970	1974	1975	1977	1979
1–10	11.0	8.8	7.3	7.1	6.3	5.5
11–25	35.4	30.2	29.8	29.2	25.9	22.9
25	5.6	5.3	4.8	4.3	5.3	5.1
Total	52.0	44.3	41.9	40.6	38.2	34.4
Cigarettes per day	*Females* 1965	1970	1974	1975	1977	1979
1–10	10.6	9.1	7.4	8.6	7.1	6.4
11–25	19.1	19.9	19.1	19.8	19.1	18.7
25	1.4	1.7	2.0	1.7	2.3	2.5
Total	31.1	30.7	28.4	30.1	28.8	27.9

FIGURE 3

Percentage of Regular Cigarette Smokers*
Ontario
Cigarettes Smoked Per Day



* 15 years of age and over

TABLE 7

Percentage of Regular Cigarette Smokers in Population 15 Years of Age and Over, by Level of Education, Ontario, Selected Years, 1975, 1977, 1979.

	Males			*Females*		
Level of Education	1975	1977	1979	1975	1977	1979
Grades 0–8	44.7	42.0	39.4	24.0	21.8	20.2
Some high school; no post secondary	42.5	41.1	36.3	33.6	32.5	32.8
High school; some post secondary		36.1	29.2		30.1*	20.4
Post secondary certificate or diploma	29.7	34.3*	31.7	24.6	28.4	27.3
University		23.5*	22.2		**	19.6
All levels	40.6	38.2	34.4	30.1	28.8	27.9

*High sampling variability

**Estimate unreliable

APPENDIX 3A.1

THE HEALTH RISKS OF INVOLUNTARY SMOKING

Inhalation of the atmospheric pollutants from the smoke of tobacco products is referred to as involuntary (passive, second-hand) smoking. Because of the quantitative and qualitative differences in the exposure, the effects must be approached as a problem separate from that of voluntary smoking.

Work on this problem has only recently achieved importance among research granting bodies and research workers. Nonetheless, the results of environmental studies, as well as studies of involuntary smokers, both healthy and diseased, are now rapidly accumulating. Three separate areas of relevant findings have emerged concerning:

- Levels of specific substances (e.g., carbon monoxide, particulates, nicotine, etc.) found in various situations where smoking occurs.
- Effects of involuntary smoking on healthy children and adults.
- Effects of involuntary smoking on persons with pre-existing diseases or conditions such as allergies, asthma, heart and lung disease.

LEVELS OF SPECIFIC SUBSTANCES

For a detailed listing and characterization of the known and measured constituents of main-stream, side-stream, and ambient indoor air tobacco smoke in various situations, the reader is referred to two reports (Stedman, 1968; U.S. Public Health Service, 1979).

While levels of various substances in an indoor environment where smoking is occurring or has occurred have been shown to vary within wide ranges, depending upon the type and amount of tobacco smoke as well as the size and ventilation of the room, certain relevant findings can be summarized, as follows:

1. Carbon Monoxide

Carbon monoxide is one of the important constituents of cigarette smoke (five volumes per cent in main-stream smoke and ten to fifteen volumes per cent by weight in side-stream smoke) (Bockhoven & Niessen, 1961). Concentrations of CO measured in public places, meeting rooms, transportation systems and other places, frequently exceed ambient air quality standards. For example, Harke and Peters (1974), showed levels of carbon monoxide from twelve to twenty-four parts per million in an automobile under varying conditions of ven-

tilation and no ventilation, with four cigarettes being burnt in the car. Others have shown levels this high and higher in intercity buses (Rylander, 1974; Schmidt, 1970) and in nightclubs and restaurants (Sebben *et al*, 1977). Similar observations have been reported in rooms of varying size with either machine smoke, simulating a certain number of individuals in a room, or under actual living conditions, such as a party or meeting (Horvath *et al*, 1971). Most of these measurements have shown occasions in which the ambient air, under the stated conditions, contained carbon monoxide up to several times the maximum ambient air quality standard of nine parts per million.

2. Nicotine

Although it is carried in the particulate phase of cigarette smoke, nicotine has been measured separately, since it is produced in physiologically important quantities and has short-term and long-term effects upon those exposed to cigarettes. Levels of nicotine measured in ambient air in many of these environments also have been shown under certain circumstances to exceed even maximum threshold limit values for industrial exposure (500 μg per cubic meter) in unventilated areas (Harke, 1970).

3. Total Particulate Matter

Under many circumstances where tobacco is burned, total particulate material (particles per cubic meter) has been shown to be very high in ambient air. The particulates contained in tobacco smoke peak in a size range of .1 to 1 micrometer — an eminently respirable range, since almost all of these particles will reach deep lung spaces. As tobacco smoke ages in a room the nicotine tends to precipitate out, a good deal of it being associated with particles which will slowly settle, and as some of the smoke particles coalesce in older tobacco smoke, the mean particle size rises. However, in ongoing measurements of smoke which continues to accumulate, the vast majority of particles remain in the respirable range. The few measurements in the literature of total particulate material under conditions of indoor smoking indicate tremendous variations in counts, but in at least two reports (Elliot & Rowe, 1975: Lefcoe & Inculet, 1975) provide evidence of situations where air quality standards have been exceeded.

4. Other Substances

A fair weight of the argument against smoking in indoor conditions is based on irritation of eyes and respiratory mucous membranes, on a short-term basis. Acrolein and other irritating substances have been shown to emanate from cigarette smoke and to persist in indoor air. Acrolein has been found to exceed threshold limit values on occasion (Jermini *et al*, 1976).

The effects of the hundreds of other substances, many of them highly toxic in other situations in more concentrated forms, have not been evaluated under passive smoking conditions. However, many are known carcinogens, and respiratory membrane irritants. A complete listing of substances known to be present in cigarette smoke is well beyond the scope of this review. The reader is referred to a recent Surgeon General's Report of 1979 (U.S. Public Health Ser-

vice, 1979) in which a comprehensive tabulation of the volatile and non-volatile constituents is provided.

5. Summary

Reference to threshold limit values for ambient air quality standards has been useful in the initial assessment of levels of specific substances found under passive smoking conditions. However, these standards were drawn up for different purposes, and may not be appropriate for assessing the long-term effects of inhaled pollutants upon the population, of which a percentage may be particularly susceptible because of the presence of certain diseases and conditions.

Nonetheless, there is firm evidence that cigarette smoking in various indoor environments — automobiles, buses, offices, homes, restaurants, etc. — may give rise to levels of specific pollutants well above those normally found in everyday situations in the absence of cigarette smoke and these levels often exceed standards for human exposure, where such standards exist. This finding has repeatedly been observed in actual and experimental conditions for the major constituents of cigarette smoke — carbon monoxide, nicotine and total particulates. The long-term effects of exposure in passive cigarette smoking situations to other identified smoke constituents, which occur in lower and trace amounts, are not known.

EFFECTS IN HEALTHY PERSONS

1. Children

Effects on the respiratory system associated with parental smoking habits have been repeatedly documented. The first report was that by Cameron *et al*, (1969). A relationship was found between childhood respiratory illness and parental smoking habits in children under sixteen. The study, conducted by telephone interview, was not well controlled for other known factors that may have affected the results, such as smoking by the children themselves or socio-economic class.

Colley *et al* (1974) reported on bronchitis and pneumonia in 2,205 children up to 5 years of age, as related to the smoking habits of the parents. In this age group the proportion of children smoking would, of course, be virtually zero, and the study was well-controlled for relevant variables such as social class, family size, and parental symptoms. The incidence of pneumonia and bronchitis in the first year of life was associated with parents' smoking habits — being lowest when both were non-smokers and highest when both smoked. Fergusson *et al* (1981) also showed a relationship between maternal (but not paternal) smoking habits, and respiratory illness in the first year of life. Colley and others (Colley *et al*, 1973; Kiernan *et al*, 1976) reported a carefully conducted eight-year prospective study, in which many confounding variables (e.g., number of siblings, later smoking habits, parental smoking habits, and respiratory disease) were taken into account. Respiratory symptoms and/or illness in later childhood and adult life were found to be related to early childhood respiratory illness.

Wheezing in young children up to the age of 5 also appears to be more common if the parents smoke (Leeder *et al*, 1976, Weiss *et al*, 1980). As well, Said *et al* (1978), in a well-controlled study, reported increased risk of adenoidectomy and/or tonsillectomy in children of parents who smoked and a highly significant dose-response relationship was observed. They considered the necessity for these procedures to be indicators of repeated upper respiratory tract disease in children. Other studies over the past ten years support the suggestion that infants and young children in the home are affected by parental smoking habits (Hasselblad *et al*, 1981; Tager *et al*, 1979; Taylor & Dickinson, 1972).

Recently, Bonham and Wilson (1981) summarized their analyses of data from the 1970 National Health Interview Survey in the United States as follows: "Children in families with no smokers had an average of 1.1 fewer restricted-activity days and 0.8 fewer bed-disability days per year than did children in families with two smokers. Children in families with one smoker were in between. Acute respiratory illness accounted for the difference in disability days among children in families with different smoking characteristics. Family smoking was also measured by the combined number of cigarettes smoked by adults; children in families which smoked 45 or more cigarettes a day had 1.9 more restricted activity days and 0.9 more bed-disability days due to acute respiratory conditions than did children in families who did not smoke cigarettes. The age of the child, the number of adults in the family, the education of the family head, and the family income were all controlled and did not eliminate the relationship between children's health and family smoking".

In summary, there is growing evidence that parental smoking in the home does adversely affect the respiratory system of young children and the effect is probably dose related. The question of whether passive smoking in childhood leads to a greater incidence and severity of adult respiratory disease is not clearly answered as yet.

2. Adults

i. *Acute effects*

Most of the public consciousness regarding passive smoking is related to the acute irritative effects of indoor environmental cigarette smoke upon the eyes and respiratory mucous membranes. In early studies, Johansson and Ronge (1965) documented the weight of particulates in a room required to elicit eye irritation in smokers and non-smokers. Speer (1968) interviewed 250 normal patients and found that 69% reported eye irritation, 32% headache, 29% nasal symptoms, and 25% cough when exposed to smoky atmospheres. A study involving several federal U.S. agencies (NIOSH, 1971), in which questionnaires distributed to passengers on military and commercial aircraft were analysed, produced notable results. Although the planes were well ventilated and carbon monoxide levels (as an index of the total smoke in the plane) were low, over 60% of the non-smoking passengers and 20% of the smokers reported annoyance by smoke in the air. Almost 3/4 of the non-smoking passengers on commercial flights and 62% of the non-smoking passengers on military flights were in favour

of segregating smokers from non-smokers. This study may have been one of the early stimuli leading to the current segregation found on commercial flights.

Other studies involving large numbers of passive smokers have corroborated the above-reported complaints with approximately the same percentages of eye, nose and lower respiratory tract irritation (e.g., Harke, 1970; Weber *et al*, 1976). Shephard and Labarre (1978), surveyed 1,000 individuals in Toronto and found that only 11.6% of non-smokers were unaffected by passive exposure to cigarette smoke. The main symptom reported by non-smokers and ex-smokers was stinging of the eyes. Older respondents were affected more frequently.

The Christmas Seal League of Southwestern Pennsylvania (Donahue & Capshaw, 1977) conducted a survey of 9,415 residents of the six county areas surrounding Pittsburgh. This study was conducted in shopping malls, offices, schools, restaurants and other areas. Non-smokers constituted 70% of those interviewed (50% lifetime non-smokers, 20% ex-smokers). In this large, but not carefully designed study, 73% of the non-smokers, 66% of the ex-smokers and 41% of the smokers indicated that tobacco smoke in indoor air bothered them. The places where smoke was most bothersome were similar to those found in other studies, i.e., cars 75%, restaurants 64%, planes and buses 53%, elevators 52%, friends' homes 51%, waiting rooms 51%, meetings 43% and hospitals 41%.

ii. *Chronic effects*

(a) Airways

In the first reported study of possible damage to small airways by passive smoking, White and Froeb (1980) provided data on cigarette smokers and non-smokers who had been evaluated during a physical fitness course offered at the University of California, San Diego, between 1969 and 1979. Most of the subjects resided in San Diego, an area low in air pollution, and smoking habits were assessed by extensive self-administered questionnaires completed on two separate occasions. The reliability co-efficient of the test and retest was high. Of the original candidates, many were disqualified because they indicated on the questionnaire that they had a history of pulmonary or cardiac disease, persistent cough, recent asthma, respiratory illness, or bronchial disturbances, that they had occupational exposure to dust or toxic fumes, that they lived in smoggy or dusty areas, or that they had been employed in areas associated with industrial pollution. The remaining 2,100 respondents were assigned to six groups according to exposure to tobacco smoke. These ranged from non-smokers not exposed to cigarette smoke, through non-smokers inhaling greater than forty cigarettes per day for twenty years. Of particular interest were the non-smokers and the results indicated striking differences between the non-smokers who were exposed to second-hand smoke and those who were not. Forced mid-expiratory flow rates (FEF 25 — 75%) were lower in the non-smoking involuntary smokers than in the non-smokers not exposed to tobacco smoke at home or at work ($p<0.005$). These investigators concluded that chronic exposure to tobacco

smoke in the work environment is deleterious to the non-smoker and significantly reduces small airways functions.

(b) Lung cancer

Hirayama (1981), reported the results of a prospective study involving 265,118 adults. Of particular interest were those for lung cancer in the 91,540 married women. Age-adjusted lung cancer mortality rates were lowest for wives of non-smokers, intermediate for wives of light or ex-smokers, and highest for wives of heavy smokers (20 plus per day). This exposure — response relationship was statistically significant ($p < .01$). Non-smoking wives of smokers also experienced increased mortality from emphysema and asthma, but the trend was not statistically significant. Passive smoking did not result in a detectable increase of ischemic heart disease. The author estimated that the lung cancer risk associated with involuntary smoking was 1/3 to 1/2 that associated with voluntary smoking.

Trichopoules *et al* (1981), in a case-control study of female lung cancer cases in Athens, Greece, found a risk of lung cancer of 2.4 times higher for wives of men who smoked less than a pack per day and 3.4 times higher for wives of heavy smokers, compared with the wives of non-smokers. Although this study involved only small numbers the results are consistent with those of the much larger, prospective study by Hirayama described above.

In contrast to these studies, Garfinkel (1981), reported on the 12-year follow-up of 176,730 non-smoking women, who were stratified according to husbands' smoking habits. While the risk of lung cancer among the non-smoking wives of smoking husbands was increased over that of wives of non-smokers, the difference was not statistically significant.

The limitations of each of these studies have been thoroughly discussed (U.S. Public Health Service, 1982). Although the currently available evidence is not sufficient to conclude that passive smoking causes lung cancer in non-smokers, the evidence does raise concern about a possible serious public health problem.

EFFECTS ON PERSONS WITH CERTAIN DISEASES AND CONDITIONS

1. Cardiovascular Disease

Anderson *et al* (1973), and Aronow *et al* (1974), have shown that exposure of patients to carbon monoxide at low levels may have deleterious effects on both angina pectoris and intermittent claudication. Aronow (1978) demonstrated the effect of passive smoking in shortening time to angina in exercising patients. Patients exposed to passive smoking in a non-ventilated room had increases in resting heart rate, systolic and diastolic blood pressure, and venous carboxyhemaglobin. The duration of exercise until angina occurred was decreased 22% after passive smoking in a well-ventilated room ($p<0.001$), and 38% after passive smoking in a non-ventilated room ($p<0.001$), and the onset of angina under passive smoking conditions occurred at lower heart rates and systolic blood pressure levels.

2. Allergies

Pipes (1945) observed that 15% of patients with respiratory allergies gave a history of their respiratory allergy being precipitated or aggravated by exposure to tobacco smoke. Speer (1968) reported that among 250 non-allergic non-smokers compared to 191 allergic non-smokers, eye irritation was experienced about equally. However, nasal symptoms were experienced on passive exposure to tobacco smoke by 61% of the allergic patients, and by 29% of the non-allergic patients. The frequencies of other symptoms among these two groups respectively were: headache (46%, 32%); cough (46%, 25%); wheezing (23%, 4%); sore throat (23%, 6%); and hoarseness (16%, 4%).

3. Pulmonary Disease

There is a paucity of studies on the effect of passive smoking on chronic pulmonary disease. Pimm *et al* (1977) showed no consistent effect on the ventilatory function of asthmatics upon passive exposure to cigarette smoke. O'Connell and Logan (1974) assessed the effects upon asthmatic children if parents stopped smoking and reported improvements in eighteen of twenty children. In contrast, only four of fifteen asthmatic children improved when parents continued to smoke.

Dahms *et al* (1981) reported that their asthmatic subjects placed in an environmental chamber for sixty minutes with exposure to side stream cigarette smoke showed a highly significant and substantial decline in pulmonary function. None of the control subjects demonstrated a change in lung function. There was a suggestion that the extent of these changes was related to the degree of methacholine sensitivity.

DISCUSSION

New work continues to be reported on the long-term chronic effects of passive smoking. Controversies, such as the one concerning the validity of the reports of Hirayama (1981), Trichopoulus, (1981), and Garfinkel (1981), with regard to lung cancer in non-smoking wives who have been passively exposed for years to tobacco smoke because of their husbands' smoking, no doubt will continue. However, the weight of evidence in the area of chronic effects is increasing. The reports of acute irritation of the respiratory and eye membranes support opinion surveys which indicate quite clearly the demand for "clean air" in public places including offices, other work places, bars, restaurants, public transportation and hospitals (Donahue & Capshaw, 1977; Gallup Opinion Index, 1978; Shephard & Labarre, 1978). In these surveys the respondents, smokers as well as non-smokers, favoured actions of various kinds, including legislation to control cigarette smoke in enclosed spaces.

Legislation can involve the definition of areas where cigarettes can be smoked, banning cigarettes altogether in certain areas, and/or a mandatory separation of smokers from non-smokers. As a continuing practical solution to the separation of smokers from non-smokers, attempts have been made to

change ventilation patterns in rooms and buildings, to filter cigarette smoke, and/or to exhaust occupied premises at a rate which guarantees a very low level of residual cigarette smoke. However, no reports of the overall effectiveness, or the cost of these attempts, are available.

Assuming that the ideal response — banning smoking entirely in certain areas — is not acceptable, what approach can best meet the requirements of those people who are irritated or otherwise adversely affected by the second-hand cigarette smoke? The segregation of smokers to one side of restaurant or meeting room, or to one end of an aircraft, is not satisfactory. Within an hour the mixing of room air is such that smoke is carried to all parts of the enclosed space, with little difference between the "smoking" and "non-smoking" sections (Sebben *et al* (1977). Repace & Lowrey (1980) have shown both theoretically and experimentally that under the practical range of standard ventilation practices and building occupancy the "respirable suspended particles (RSP) levels generated by smokers overwhelm the effects of ventilation and inflict significant air pollution burdens on the public. Attempts to reduce RSP levels from smoking by increasing the rate of mechanical ventilation or the efficiency of filtration yield exponentially diminishing returns for linear increases in ventilation energy (and cost)".

Many institutions have purchased high volume electrostatic filters. These have been, as predicted by Repace & Lowrey (1980), completely outpaced by continual smoking, so that even the particle counts remain high. Since these filters have no effect upon gases (except to add a little ozone to the ambient air), the gaseous pollutants continue at high levels. Thus electrostatic filters are not the solution.

The energy cost of exhausting air is compounded in cold weather (Repace & Lowrey, 1980). In one Canadian city, the cost of heating 1,000 cu. ft. per minute of outside air to replace exhausted smokey air is $1,300.00 per heating season (personal communication to N.M. Lefcoe from the Maintenance Department, Victoria Hospital, London). Additionally, air conditioning cost would apply in the summer. Whereas it takes 5–10 cfm of outside air to provide adequate ventilation per non-smoker, 30 cfm are required for a smoker, implying a 3 to 6 fold increase in energy requirements.

An untested partial solution might be to borrow from "clean room" principles and use laminar flow exhaust or filtration (particulate and gaseous) at relatively low flows, taking great pains, as has not been done so far, to move the laminar flow towards the smoking section of the room, where a room is divided into "smoking" and "non-smoking" sections. The same principle might apply to public transportation facilities. If the rear part of the passenger quarters (train, bus or airplane) is the smoking area, then the exhaust system should be located at the rear with fresh air entry at the front, thus protecting the non-smoking area from smoke diffusing forward.

What is clear is that the control of smoke in buildings is a difficult problem for several reasons and that energy costs alone may be prohibitive. The banning of smoking in certain areas by legislation or other means thus appears to be the only feasible solution. Provincial legislation will be required to ensure that a

uniform standard of protection in public places exists in all areas of the province. Smokers and non-smokers alike need to know what the "rules" are and that they apply in all parts of Ontario. Non-smokers moving from one jurisdiction to another should be assured of uniform protection. Municipal by-laws will not ensure a uniform standard across the province since not all areas of the province can be covered, and, as well, considerable variation in the content of by-laws among municipalities might be expected.

In 1976 the Government of Ontario published a set of guidelines for the establishment of non-smoking areas. While this Task Force is in full agreement with the intent of these guidelines, the growing body of evidence in support of restrictive measures and the seriousness of the smoking epidemic have persuaded the Task Force that guidelines are no longer sufficient and that more stringent restrictive measures are required. Some of the proposals for restrictive measures which are contained in the report simply represent the movement of established guidelines along the continuum of restrictive measures into legislation. Others represent a broadening of the scope of the 1976 guidelines. These changes are in keeping with changing public attitudes to this serious health problem.

APPENDIX 3A.11

SOCIAL-PSYCHOLOGICAL FACTORS INFLUENCING INDIVIDUAL AND COMMUNITY ATTITUDES, POLICIES AND BEHAVIOURS CONCERNING RESTRICTIONS ON SMOKING

A. THE SOCIAL SUPPORT SYSTEM FOR SMOKING

The social support system for smoking is defined as the interwoven fabric of social definitions, beliefs, attitudes, customs, norms and laws that define smoking as normal, expected and appropriate, and an implicit fundamental right. It is believed that such a system of social support governs the occasions under which smoking occurs, as well as the socially conventionalized interpretations that are given to it (Markle & Troyer, 1979; Nuehring & Markle, 1974).

The combined efforts to combat smoking during the past 20 years have had an impact on this support system. The Non-Smokers Rights' movement has been cited as the first modern widespread challenge to the support system of a smoking oriented society (Schmidt, 1975; Shor *et al,* 1980).

There is a clear need to counteract the social support system for smoking and to replace it with one in which non-smoking is the normative behaviour in society. Unquestionably, the Rights' movement has an important part to play in this transition, but there are other social sub-systems that also determine whether smoking will continue to be normative behaviour.

These include the education system, the health care system, the voluntary health system, consumer organizations, and government bodies, among others. Thus, change in normative behaviour regarding smoking will be accomplished not solely by stressing rights, but also by demonstrating the risks of smoking to individuals and the community as a whole. The degree to which non-smoking becomes the normative behaviour in society will determine the degree to which restrictive measures on smoking are accepted and supported.

B. DETERMINANTS OF ATTITUDES AND BEHAVIOUR CONCERNING RESTRICTIONS ON SMOKING

1. Perceptions of Risks and Problems

The introduction of measures to restrict smoking and compliance with such measures will be determined, in part, by the perceptions of individuals concerning the health risks associated with second-hand smoke. The perceptions of the

smoker and the non-smoker are equally important — the latter, as a basis of pursuing measures that will help to alleviate risks and problems associated with second hand tobacco smoke, and the former as a basis for co-operation and consideration, and, where indicated, compliance in response to reasonable limitations or restrictions on smoking (Shor *et al*, 1980).

On the assumption that there is sufficient information available on which to base programs supportive of restrictions on smoking, these programmes should be pursued through sound educational means. The degree to which the perceptions of smokers and non-smokers concerning the health risks associated with second-hand tobacco smoke are carefully and realistically developed will determine the acceptability of the measures for limiting and restricting smoking in public and private settings (Gallup Opinion Index, 1978).

2. Role Modelling

Smoking restrictions assume added significance within certain locations because of the nature of the activities being carried out — e.g., the education of youth (schools, youth agencies), care of the sick (hospitals, clinics, physicians' offices), health promotion and fitness settings (health clubs).

Do educators, health workers, fitness staff and youth workers have a responsibility to support, promote and comply with smoking restrictions in their work areas because of the sensitive exemplar role they can provide to those for whom they function? Health workers have been studied to determine their views as to their roles and responsibilities in smoking and health (Matthews *et al*, 1976).

The roles of health professionals identified by Rosen and Ashley (1978) and by Lichtenstein and Danaher (1978) included those of exemplar, educator, identifier and modifier of risk behaviour, lobbyist and researcher. However, they conclude that health professionals have not yet reached their full potential in enacting these roles.

The same conclusion can be drawn with regard to other key professional groups. The potential area of influence of these groups is wide. The extent to which members of these groups support smoking restrictions in their own areas of responsibility will undoubtedly be observed by the groups they serve.

3. Corporate, Government and Institutional Policies

The introduction of restrictive measures on smoking raises an immediate question: by what authority has the measure been enacted? The questions that follow are: what is the penalty for lack of observance or compliance, and how is the restriction to be enforced? (U.S. Public Health Service, 1979).

The question of enforcement is used as an argument for not enacting anti-smoking legislation, the argument being that if a law can't be properly enforced, it is better to not have the law. However, evidence does exist that posting of non-smoking signs does elicit compliance by many smokers (Dawley, 1981). Observations made in establishments with smoking restrictions indicate that signs and

directives have a significant effect when no penalties or enforcement mechanisms have been specified (Dawley, 1981).

In the State of Minnesota a high level of compliance has been reported with respect to their Clean Indoor Act enacted in 1975 (Gottier, 1979). Approximately 100 complaints per month are received by the State Health Department. In most instances, the party at fault is co-operative in response to departmental citations. To date, no lawsuits have been undertaken. The cities of Toronto and Ottawa also report a high level of compliance with non-smoking signs posted in public areas covered by their non-smoking by-laws, despite the absence of effective enforcement provisions in their by-laws.

Recent public surveys indicate a high percentage of the population favourable to the establishment of special areas for smokers and non-smokers. Overall in Canada, the percentages were 87.4 per cent of non and ex-smokers and 60.4 per cent of smokers (Data Laboratories, 1978).

Goldfarb and Gallup conducted separate surveys in the summer of 1981, to determine public views concerning non-smoking areas in restaurants. Goldfarb reported that 66 per cent of a Toronto sample was in favour of non-smoking areas in restaurants (Toronto Star, April 29, 1981). Gallup reported that 59 per cent of a national (Canadian) sample prefer separate areas for smokers and non-smokers. Of those favourable to separate areas for smokers and non-smokers in the Gallup poll, 45 per cent were smokers and 55 per cent non-smokers (Toronto Star, April 8, 1981).

It can be concluded that corporate, government, and institutional policies to limit or restrict smoking are in line with current public views and should, therefore, be encouraged.

4. Health Education and Promotion

Health education and promotion presentations and projects geared to the general population are likely to reinforce the support for smoking restrictions. As well, specific educational presentations for children and young people are being developed to reinforce positive attitudes toward smoke-free public, working and recreational environments (U.S. Public Health Service, 1979). Such activities will enhance the effectiveness of restrictive measures and thus are important complementary strategies. This indicates once more the need for the integrated use of several approaches in dealing with the problem of smoking, as has been stressed throughout this report.

APPENDIX 3B

ANALYSES UNDERLYING RECOMMENDATIONS — MARKETING

CIGARETTE PRICE AND CONSUMPTION

The notion that high prices will reduce tobacco use is not new. James I of England thought as much in 1604 when he wrote:

> ". . .by which great and immoderate taking of tobacco, the health of a great number of people is impaired and their bodies weakened and made unfit for labour. . .a great part of the treasure of our land spent and exhausted by this only drug. . .all of which enormous inconvenience ensuing whereupon we do well perceive to proceed principly from the great quantity of tobacco brought into this our realm of England and dominions of Wales, from the parts beyond the seas, by merchants and others which excess we conceive might in great part be restrained by some good imposition to be laid upon it, whereby it is likely that a less quantity of tobacco will hereafter be brought into this our realm of England and dominions of Wales than in former times. . ."

King James thereupon raised the tax on tobacco by 4,000 per cent, from twopence to six shillings and eightpence a pound, but lowered it a few years later to the more tolerable level of one shilling — still 500 per cent above the 1604 rate (Bewley, 1973). The effects of the resulting changes in price on consumption were unrecorded.

Econometric Studies of Tobacco Consumption

The first formal, systematic attempt to relate the consumption of tobacco to economic factors seems to have been that of Schoenberg (1933), noted briefly in Laughhunn and Lyon (1971). In this analysis, the price elasticity* of cigarettes for the U.S. was estimated by relating annual changes in price and consumption that had occurred during the years 1923–1931. This is known as a time-series analysis. It is one of the three methods of estimating elasticity that have been

*The price elasticity of a commodity for a particular population is the change in average consumption that occurs with unit change in average price. Thus, if the price elasticity of tobacco is -0.5, this means that a 1% increase in price will produce a 0.5% *decrease* in tobacco use. It is important to distinguish between real and current price elasticities. Income elasticity is similarly defined.

employed. The result of Schoenberg's analysis is given in Table 1 together with the results of other estimates of price elasticity that are discussed here. The paper by Laughhunn and Lyon (1971) summarizes other early estimates.

The second general method of estimating price elasticity is the quasi-experimental method, as employed by Lyon and Simon (1968). These authors look at the individual effects of 73 tax-induced increases in cigarette price that had been implemented in 41 U.S. States during the years 1951–1954.

The third general method of estimating price elasticity is the cross-sectional method, in which spending on the item is examined as a function of the distribution of income in a population. From this, an estimate is made of how consumption might change if price or income were to change. Laughhunn and Lyon (1971) employed the cross-sectional method to develop estimates of both price and income elasticities for cigarette demand (i.e., consumption).

TABLE 1

Various Estimates of Elasticity of Demand for Cigarettes

Author	*Year Published*	*Country*	*Elasticity Estimates*		*Method*
			Price	*Income*	
Schoenfeld	1933	U.S.A.	–0.68	–	Time-series
Tennant	1950	U.S.A.	0.00	+0.46	Time-series
Lyon and Simon	1968	U.S.A.	–0.51	–	Quasi-experimental
Laughhunn and Lyon	1971	U.S.A.	–0.81	+0.42	Cross-sectional
Russell	1973	U.K.	–0.59	+0.53	Time-series
Atkinson and Skegg	1974	U.K.	0.00	–	Time-series
Peto	1974	U.K.	–0.50[1]	–	Time-series
Miller	1974	U.S.A.	–0.40	–	Time-series
Thompson & MacLeod	1976	Canada	(– (–0.75[1]	+0.99[1] +0.47	Cross-sectional Time-series
Sehm	1977	Finland	–0.30	–	Time-series
Leu	1979	Switzerland	–0.80[2]	+0.80[2]	Time-series
Harris	1980	U.S.A.	–0.44	–	Cross-sectional

[1] Various values were given in these articles. Given here are the medians of five or six estimates of elasticity.

[2] Unlike the other estimates in this Table, Leu's estimates do not appear to have been based on deflated (i.e., real) prices and incomes. The author notes that the elasticity based on real cigarette prices "never proved to be significant".

Thompson and McLeod (1976) used both the first and third methods in their analysis of Canadian data for period 1950–1973. Apart from the new analysis to be reported below, these authors have provided the only estimates of the elasticity of Canadian demand. The estimate of price elasticity derived below (–0.73) is very close to the median estimate of Thompson and McLeod given in Table 1.

None of the estimates reported so far appeared in the health-care literature, although the point was made in each case that price increases would seem to be an effective means of curbing cigarette consumption. The first econometric analysis of cigarette demand conducted specifically with a view of improving a community's health seems to have been that of Russell (1973). He carried out a time-series analysis of the demand for cigarettes by British men for the period 1946–1971. The resulting estimates of price and income elasticities are given in Table 1.

Russell's article was criticized by Atkinson and Skegg (1974), who cited their earlier report to the effect that men are responsive to publicity but not to price, whereas women respond to price but not to publicity. The criticism was made largely on mathematical grounds. After a complex analysis, Atkinson and Skegg concluded that Russell had ignored an effect of real disposable income, which he had not considered independently, and that he had "overestimated the price elasticity by attributing to price changes the immediate postwar readjustment of demand and the reaction during the 1960's to publicity concerning the effects on health." (It should be noted that Russell had allowed for these effects, but not in a manner satisfactory to his critics.)

A subsequent article cleared up some of the confusion (Peto, 1974). The major discrepancy concerning the significance of price was attributed by Peto to the choice of method of deflation: Peto preferred Russell's simple method. Peto seemed ambivalent about the role of income. He suggested that only very large changes in income might be important, but also that the rising trend in consumption ov the period might be attributable to the general rise in income. Peto gave more attention than had Russell given to other factors, including publicity on the adverse effects of smoking on health (he estimated a fall in consumption of about 5% following the 1961 Royal College of Physicians Report), and the 1965 ban on television advertising (which he estimated to produce a 3% decline in use, but not significantly different from zero). Peto concluded that price elasticity was in the range –0.37 to –0.64, and that "Although the persistence of these remains uncertain, it thus seems likely that systematic increases would have an immediate and progressive effect on consumption and recruitment, particularly among young people, who are less wealthy and less addicted."

Apart from the above-noted study by Atkinson and Skegg (1974), the only finding of no price elasticity was that of Tennant (1950), in an influential, comprehensive book on the U.S. tobacco industry. His rejection of price as an influence upon tobacco use possibly explains why there was little interest in the matter for the next two decades.

According to Tennant, the large increases in cigarette consumption in developed countries during the 1950s and 1960s would have resulted chiefly

from the large increases in disposable income. There were growing concerns during these decades about the health hazards of tobacco use, given focus by the U.S. Surgeon-General's assertion of a causal relationship between excessive smoking and lung cancer in 1957, by the report, *Smoking and Health*, of the British Royal College of Physicians in 1962, and by the comprehensive report of the same title by the U.S. Surgeon-General in 1964. However, the only economic remedy, if Tennant's analysis was correct, would be to curb incomes. It is no wonder that people concerned to reduce smoking looked to other solutions.

Thinking about the utility of price increases as a means of curbing tobacco use was changed largely by Russell's 1973 article (Atkinson & Skegg, 1974), mentioned previously, which appeared in the *British Journal of Preventive and Social Medicine*. Since then, European countries, notably Britain, have introduced tobacco tax increases, the main intention of which was to curb cigarette use.

Also, further studies of the relation between price and consumption have been stimulated, including the work of Sehm (1977), Miller (1974), and Harris (1980), noted in Table 1. Miller has also produced estimates for other countries (Miller, 1977).

The work summarized in Table 1 suggests that the price elasticity of cigarettes in various places and at various times is in the order of -0.5, meaning that a 10% rise in the real price of cigarettes produces a 5% decline in consumption. Health-care workers treat even a 5% decline in use as cause for celebration, but there is still considerable reluctance to embrace price increases as a means of curbing consumption. For example, in the influential 1979 U.S. Surgeon-General's Report, "Smoking and Health", a lukewarm discussion of the effects of cigarette price on consumption occupies less than one page of hundreds on the determinants of smoking and on education and prevention.

A New Analysis of Canadian Data

There appears to have been only one study of tobacco price and consumption based on Canadian data (Thompson & McLeod, 1976), as noted in Table 1. A new analysis was conducted for the Task Force to allow better assessment of the likely impact of price increases in Canada. The results of this new analysis are consistent with the earlier work.

Information on sales of cigarettes (Statistics Canada, 1968–1980), population (Statistics Canada, 1980), the consumer price indices for all goods and for cigarettes (Statistics Canada, 1968–1980), and total disposable income (Statistics Canada, 1976–1981) were obtained from Statistics Canada sources for each of the years 1949–1980. These were converted into cigarette consumption per capita, the relative or real price of cigarettes (setting 1949 = 100), and the disposable income per capita for each year, as listed respectively in Columns A, B, and C of Table 2. Also shown in Table 2 for each year are cigarette price as a proportion of disposable income (setting 1949 = 100) in Column D, and consumption adjusted for increases in disposable income in Column E. (This last correction was achieved by assuming consumption to be directly proportional to disposal income, and deflating actual per capita consumption in each year by the

increase in disposable income from 1949).

The two most important variables — average consumption and real price — are also shown graphically in Figure 1.

Elasticities were computed using the method employed by Russell (1973). This is the simplest method of those reviewed. The mathematical sophistications encountered in other analyses do not seem to afford evident improvement over his method. Russell's method consists of plotting the percentage changes in average consumption against the percentage changes in price, and estimating the straight line that best describes the points by the least-squares technique.

The slope of this regression line was found to be -0.73, which is the estimate of the price elasticity of cigarettes in Canada. This means that for each increase in real price of 1%, there will result a decline in average consumption of 0.73%. The significance of the fit of the points to the line was extremely high, as measured by a t-test of the correlation between the two variables ($t = 4.99$; $P < 0.0001$). The regression line did not pass through the point where price and income change were both zero. When the price change was zero, the regression line indicated a consumption increase of 2.0%, suggesting that factors other than declining real price were responsible for consumption increases during the period in question. Conversely, the regression line indicated that a 2.7% real price increase would have been required each year over the period just to keep consumption constant.

Percentage changes in consumption were also plotted against percentage changes in disposable income. The points were so scattered that the line that was found to fit them best was not significant ($t = 0.49$; $P > 0.20$), meaning that the regression line did not describe the points. The slope of the line (+0.20) nevertheless seemed to portray the lack of consistency between changes in income and changes in cigarette consumption.

Similar analyses were carried out for the relation between consumption and price relative to disposable income, and for the relation between consumption adjusted for income changes and price. The results of these and the earlier analyses are given in Table 3.

The price elasticity found here (-0.73) is close to the median (-0.75) of the values reported by Thompson and McLeod (1976) using a similar but more sophisticated technique and a shorter time series (1953–1970). These authors also developed reliable estimates of income elasticity (median value = +0.47). The difference in income elasticity estimates between that analysis and the present one cannot be explained for the moment.

Line 3 of Table 3 gives the results of the analysis in terms of changes in cigarette price in proportion to disposable income. Russell (1973) found that consumption changes varied almost as closely with this index as they did with changes in real price. Here no such relationship was found, adding to the conclusion that income is not an important factor in cigarette use in Canada.

However, cigarette use might not be sensitive to *local* changes in income, as assessed in the analysis represented in Line 2 of Table 3, but rather to longer term trends in income. To assess this possibility, cigarette consumption was assumed to be directly proportional to real disposable income, and then deflated

TABLE 2

Time-series Used in Econometric Analyses

Year	Per Capita Cigarette Consumption (A)	Relative Price (B)	Real Disposable Income in 1949 $ (C)	Price as a Proportion of Real Disposable Income (D) (= B x 920.4 ÷ C)	Consumption Corrected for Income (E) (= A x 920.4 ÷ C)
1949	1252	100.0	920.4	100.0	1252
1950	1252	99.8	941.8	97.5	1224
1951	1261	97.8	968.5	92.9	1198
1952	1234	98.2	1004.0	90.1	1131
1953	1421	84.8	1032.0	75.6	1267
1954	1455	82.0	1005.7	75.0	1332
1955	1556	82.0	1057.9	71.3	1362
1956	1678	80.9	1122.1	66.4	1376
1957	1815	78.4	1121.6	64.3	1489
1958	1910	76.3	1137.1	61.8	1546
1959	1939	80.4	1151.6	64.3	1550
1960	1925	81.4	1160.7	64.5	1526
1961	2012	80.6	1140.5	65.0	1624
1962	2083	79.9	1208.3	60.9	1586
1963	2110	78.5	1237.1	58.4	1570
1964	2113	77.8	1264.3	56.6	1538
1965	2198	78.4	1330.2	54.2	1521
1966	2323	78.9	1385.1	52.4	1544
1967	2297	79.4	1418.7	51.5	1490
1968	2235	85.7	1457.6	54.1	1411
1969	2218	85.9	1494.2	52.9	1366
1970	2339	84.3	1513.1	51.3	1423
1971	2358	83.6	1611.7	47.7	1347
1972	2444	81.3	1728.9	43.3	1301
1973	2489	78.7	1861.5	38.9	1231
1974	2555	74.1	1962.0	34.8	1199
1975	2544	74.7	2047.7	33.6	1143
1976	2642	75.5	2126.5	32.7	1144
1977	2656	75.3	2141.4	32.4	1142
1978	2624	75.9	2180.0	32.0	1108
1979	2738	73.3	2208.3	30.6	1141
1980	2739	72.6	2218.1	30.1	1137

by this variable, as shown in Column E of Table 2. The adjusted consumption did vary in a systematic way with real price, as shown in Line 4 of Table 3, with almost as close an association as in the case of unadjusted price. The fact that the relationship with price survived the discounting of price by income adds to the notion that price is the primary driving factor in cigarette consumption.

A more sophisticated analysis, involving proper multivariate determination of partial regression coefficients, would be required to sort out the precise contributions of price, income, and other economic variables to cigarette consumption.

In the meantime, it is possible to say with some confidence that, other things being equal, an increase in real cigarette price will reduce cigarette consumption, and that the decline in consumption below what it otherwise would be will be approximately 0.7% for each 1% increase in real price.

Another Cause of Increasing Cigarette Use: Dose Division

A word should be added about the consumption data in Figure 1 and Table 2. Use of *manufactured* cigarettes is shown. The evident, almost relentless increase in consumption does not seem to tally with reports that smoking is on the decline. The simple solution to the discrepancy has been provided by Collishaw (1980), who has noted that whereas "the proportion of daily smokers in the population aged 15 and over 15 years of age and older declined steadily from 45% in 1965 to 34% in 1979. . .the number of manufactured cigarettes sold annually in Canada increased from 43 billion to 64 billion over the same period". The average number of cigarettes smoked daily by each smoker rose from 26.3 to 31.1 during the same period. (These estimates by Collishaw include adjustments for population change and for the smoking of hand-rolled as well as manufactured cigarettes). Collishaw's provisional estimate for 1981 is 33.0 cigarettes daily per smoker.

What has been happening? There seem to be two general possibilities:

1. Declining real prices have had their main impact on smokers, causing them to smoke more.
2. The increasing consumption during the past few decades has been caused by the move to less substantial cigarettes, which have less tobacco and provide less satisfaction to the smoker. Smokers compensated by smoking more.

Available evidence suggests that the second kind of reason is behind much of the large increase in per capita consumption shown in Figure 1.

Most of the decline in the 'strength' of cigarettes in the U.S. can be accounted for in the terms of reduced tobacco weight per cigarette. While tar and nicotine per cigarette fell 32.2% and 25.6% respectively from 1968–1978, tobacco weight per cigarette fell by 23.8% (U.S. Surgeon General's Report, 1981). Tobacco weight figures do not seem to be available for Canada. Tar per cigarette, on a sales-weighted basis, fell slightly less in Canada during the same period, from 21.1 mg to 15.0 mg, a fall of 28.9% (Rickert & Robinson, 1981). Assuming a proportionate decline in weight, this means that the average weight

of tobacco in a manufactured cigarette fell by 21.3%. Thus, in terms of tobacco weight, the average of 2235 cigarettes consumed per capita in 1968 was equivalent to 2840 of the cigarettes purchased in 1978. This exceeds the actual 1978 consumption of 2624 cigarettes per capita, which means that the whole of the increase in consumption between 1968 and 1978 can be accounted for in terms of the reduced 'density' of cigarettes, and compensation by smokers for that reduction.

FIGURE 1

Annual Per Capita Cigarette Consumption by Canadians (Filled Circles), and Price of a Regular Pack of Cigarettes in 1982 Dollars (Open Circles) for the Years 1949–1980

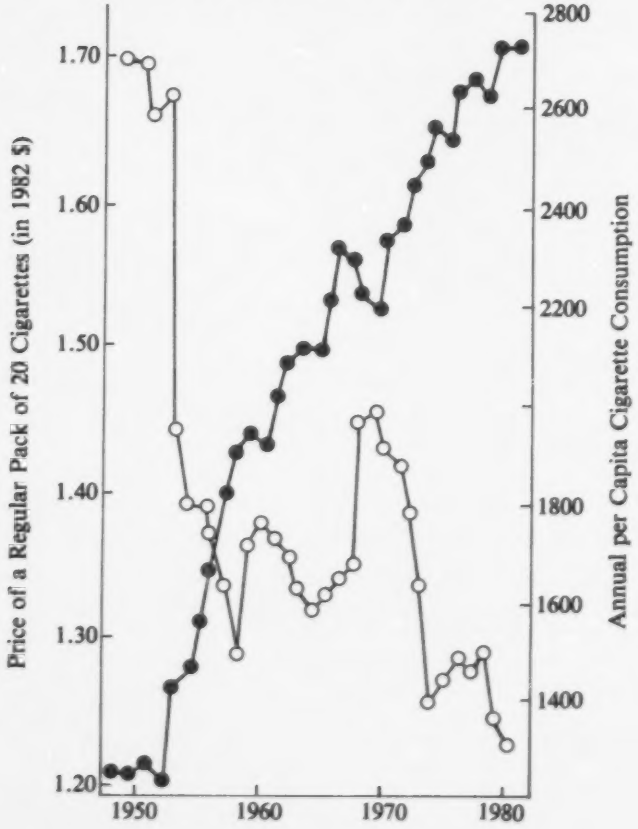


TABLE 3

Elasticity Estimates

Type of Elasticity	*Data Base*[1]	*Estimate*[2]	*Correlation*[3]	*Significance*
Price	A, B	-0.73	-0.67	P<0.0001
Income	A, C	+0.02	+0.07	P>0.2
Price relative to disposable income	A, D	+0.10	+0.09	P>0.2
Price (consumption adjusted for disposable income)	E, B	-0.69	-0.56	P<0.001

[1] Refers to columns of Table 2
[2] Slope of least-squares regression line
[3] The higher the modulus of the correlation (i.e., the value without sign) the more reliable the estimate of elasticity.

To put it another way: if Figure 1 had shown annual per capita weight of tobacco consumed in the form of manufactured cigarettes, much of the consumption curve might have been flat, and certainly that part from 1968 onwards. Thus, the trend towards increasing cigarette use would need no economic explanation, such as growth in disposable income; it is simply a matter of smokers taking their daily dose in a more divided manner. Remington (1980) has shown that in the U.S. the decline in tobacco weight per cigarette began in the early 1950's. If it began then in Canada too, almost all of the increasing trend in cigarette use can be accounted for in terms of increased dose division.

To return to Collishaw's data (1981): he reported that consumption *per smoker* increased from 25.2 per day in 1968 to 30.7 per day in 1978. Assuming that tobacco weight per cigarette fell by 21.3% during the same period, we can estimate that apparent tobacco consumption per smoker in the form of manufactured cigarettes actually fell by 4.1% from 1968 to 1978. It is useful to say "apparent" because the trend to less dense cigarettes has involved a trend to filter-tipped cigarettes, in which little tobacco is left as butt. Moreover, less dense cigarettes may be smoked to shorter butts, other things being equal. Thus, the actual amount of tobacco consumed may not have declined.

To conclude this and the previous section: two important factors have been identified in the consumption of cigarettes by Canadians — real price and tobacco weight per cigarette. Smokers will smoke more cigarettes when one or both of

these factors decreases and less when one or both increases. Both factors have tended to decline in recent years, which is largely why per capita cigarette consumption is at the highest level in history. Whereas increases in cigarette price will produce a decline in consumption that may be generally conducive to good health, increases in tobacco weight per cigarette would have a less clear effect.

The need for more information about the impact of changes in the composition of cigarettes will be discussed briefly in a later part of this Appendix.

International Comparisons of Cigarette Price and Consumption

Before proceeding to discussion of the possibility of raising cigarette prices in Ontario or Canada in order to curb consumption, a brief review will be made of prices and consumption in different countries.

Figure 2 shows per capita consumption of locally manufactured cigarettes in various countries in 1973 plotted against the price in a large city of each of those countries in May 1976 (United Nations Conference on Trade & Development, 1978; McWhinnie, Ouellet, & Lance, 1976). All countries are shown for which comparable data are available. It can be seen that, with the exception of France, the countries fall almost precisely on a line that would indicate zero consumption at about three times the price of cigarettes in Canada at that time. The figure suggests strongly that consumption is low in countries where the price is high, and vice versa. This is not conclusive proof that high prices cause low consumption, but it is fairly compelling evidence that price can play a large part in the reduction of use.

Currently the price of cigarettes in Norway and Denmark is in excess of $3.10 Canadian, according to local consulate officers, i.e., about 2.5 times the Canadian price. In Sweden the price is about twice the current Canadian price. Indeed, with the exception of the U.K., the current relative prices are similar to those portrayed in Figure 2. The current U.K. price is 75% above the current Canadian price (it was 20% above in 1976) for a cigarette that is on average 20% smaller than the Canadian cigarette. Total cigarette use in the U.K. in 1981 has been reported to be 14% below total use in 1974 (Tobacco International, 1981), which decline is consistent with the higher relative price.

It should be stressed that Figure 2 shows only use of *manufactured* cigarettes. In Norway, where cigarettes are dear, and tobacco for making cigarettes has a clear price advantage, some 70% of all cigarettes smoked are hand-rolled (Eikeland, 1980), compared with 10% in Canada (Thompson & McLeod, 1976). This means that the number of cigarettes smoked per capita in Norway is about 2.4 times higher than indicated, but still below that for any other country shown in the figure.

A Specific Proposal

A recommendation of the Task Force is that the retail price of cigarettes be doubled over a year in three equal increases made at four-month intervals. If the following assumptions are made:

1. The price elasticity is the -0.73 estimated in the foregoing analysis;

2. The elasticity remains unchanged for the large price increases being proposed, even though it was estimated from smaller changes in price;
3. Alternatives will not emerge, such as hand-rolled and bootlegged cigarettes;
4. Inflation for the year in question is even at an annual rate of 12%; it can be estimated that cigarette consumption per capita will decline by 20.7% as a result of each of the three increases, and that the cumulative effect will be to reduce consumption by 50%. Assuming that the price increases were put into effect during 1983, consumption in 1984 would be 1450 cigarettes per capita rather than an estimated 2900 per capita, i.e., cigarettes would be $2.23 per pack in 1982 dollars — above the $1.38 per pack charged in 1954 (see Figure 1), but still well below the present cost of cigarettes in Scandinavian countries. In terms of disposable income, the cost of 12,000 cigarettes (approximately a year's supply) today is 7.4% of the annual average disposable income per capita. In 1954, the cost of the same number of cigarettes was 18.5% of the annual average disposable income. (A better figure for a year's supply in 1954 was 9,000 cigarettes, which would have cost 13.9% rather than 18.5% of average disposable income.) Thus, even if an individual smoker's consumption was unaffected by the proposed price increase, the share of his or her income going to cigarettes would not necessarily exceed the share that may have been allocated in this way in 1954.

As the econometric data suggest, and as will be discussed further below, it is likely that cigarette consumption by individual consumers would decline if the prices were raised.

The reason for choosing to propose a doubling of the price, with the resulting 50% decline in consumption, is somewhat arbitrary. A smaller increase would be less dramatic, and perhaps more politically acceptable, but certainly less effective as a means of reducing cigarette use. A larger increase would put the price into or even above the range of prices presently charged by Scandinavian countries, and thus might be considered excessive and conducive to evasion.

The reason for three phased increases (as opposed to just one increase or 12 smaller increases) is to provide for increases that can be handled administratively (too many would cause confusion), increases that are phased enough to allow smokers to adjust their consumption downwards, and yet increases that are large enough individually to be salient.

Implementation

The Government of Ontario could take unilateral action by raising its tobacco tax to achieve a doubling in price. The result of this would be a decline in Federal duty and tax revenue, as will be illustrated below; and so the case of both governments raising their taxes will be considered. In each case it is assumed that the industry's revenue will decline by 25%, meaning that costs and profits per unit will rise by 50%.

Table 4 shows how the component cost of a pack of cigarettes would change in each of these two cases. In either case, the tax carried by cigarettes is seen to

rise from the present level of 51% of the retail price to the new level of 63%. In Britain, the tax portion in the price of a pack of cigarettes was 69% in April, 1981 (Tobacco International, 1981); it is now probably well over 70% with the recent large increase. Information for 1975 for 11 European countries showed a tax component ranging from 32.2% in Spain to 84.3% in Denmark (United Nations Conference on Trade & Development, 1978). In Britain, at that time, the tax portion was 72.4%. The same source shows the tax portion of the retail price of U.S. cigarettes to have been 41.2% in 1972.

Table 5 shows how annual income to governments from manufactured cigarettes sold in Ontario would change under the two scenarios. In both cases total government revenue from taxes on tobacco products would increase by $156 million, or 23.5%. Other government revenue might be affected according to how income and profits in the tobacco industry changed (including those of wholesalers and retailers of tobacco products), and according to the need for support payments to employees and industries who might be disadvantaged by the tax increase. Health-care costs should decline in the medium term on account of the reduction in smoking, representing a massive saving to government. On the other hand, in the long term, transfer payments to and the costs of care for the elderly might increase — to the extent that the benefits of reduced health-care costs would be offset.

Table 5 does not take into account avoidance of tax and duty, which would undoubtedly increase if increases of this magnitude were implemented. There could be problems posed by illegal interprovincial shipments if Ontario were to act unilaterally, similar to those occurring in the U.S. between low-tax States (e.g., North Carolina) and high-tax States (e.g., New York). It has been asserted that bootleg marketing of cigarettes in the U.S. accounted for 25–30% of sales in the mid-1970's, largely controlled by the organizations known as the Mafia, which were grossing $1.5 billion annually from this source (United Nations Conference on Trade & Development, 1978).

Thompson and McLeod (1976) noted that a 15% increase in cigarette tax was imposed by the Canadian government in 1951 but was repealed a few months later "partly because extensive smuggling from the U.S.A., where cigarettes were about half the price, was harming both the Canadian tobacco industry and the efficiency of Canada-U.S. border law enforcement".

Times have changed. The borders are better managed. A high cigarette tax might be more accepted. Other provinces and even the U.S. might be inclined to follow suit if it was made clear that higher prices would reduce tobacco use.

Nevertheless, fear of bootlegging might be a major impediment to the implementation of tax increases for the purpose of reducing cigarette use.

If loose tobacco for hand-rolled cigarettes were not subject to a similar increase, there could be a shift to this kind of tobacco use, as happened in Norway, where 70% of cigarettes are hand-rolled. In the early 1970's about 10% of cigarettes smoked in Canada were not manufactured (Thompson & McLeod, 1976). Since then, sales of the fine-cut tobacco used to hand-roll cigarettes have declined by about 30%, while sales of manufactured cigarettes have increased

(Statistics Canada, 1968–1980). The proportion of all cigarettes smoked in Canada that are manufactured is now probably close to 95%.

The estimates in Tables 4 and 5 depend critically on two assumptions: (a) that the price elasticity of cigarettes is –0.73, and (b) that industry unit costs would rise by 50% if consumption were to decline by 50%. The estimate of elasticity is quite possibly high (a colleague suggested to me that –0.40 would be a more likely value), as may be the estimate of increase in manufacturers' unit price. The effect of lower elasticity would be a smaller reduction in consumption, and larger revenues to governments. If manufacturers' unit costs increased by a smaller proportion (they may not increase at all) the tax increases would have to be higher to achieve a doubling in price. Thus the key assumptions underlying Tables 4 and 5 are both conservative from the point of view of government revenue resulting from the changes.

FIGURE 2

Per Capita Consumption in 1976 for Various Countries and the Price of a Locally-Made Pack of Cigarettes (Canada = 100) in Major Cities in Those Countries in 1973

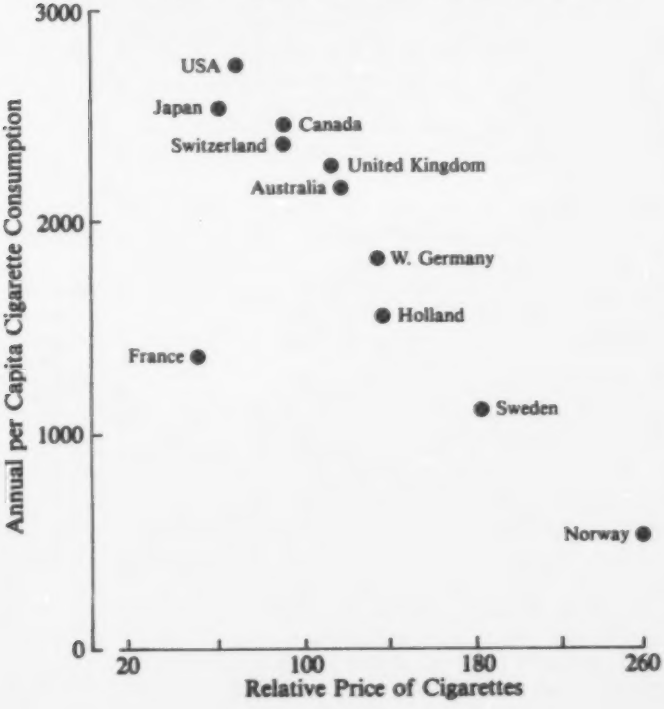


TABLE 4

Cost components of a pack of 20 cigarettes before and after a doubling in price

	Present (1982)	*Ontario Government only Raises Tax*	*Ontario and Federal Governments Raise Tax*
Tobacco grower) Manufacturer)	23¢ (19%)	35¢ (14%)	35¢ (14%)
Wholesaler) Retailer)	38¢ (30%)	57¢ (23%)	57¢ (23%)
Provincial government	33¢ (26%)	125¢ (50%)	81¢ (32%)
Federal government	*31¢* (25%)	*33¢* (13%)	*77¢* (31%)
Price per pack	$1.25 (100%)	$2.50 (100%)	$2.50 (100%)

TABLE 5

Annual Government Revenue from Taxes and Duty on Tobacco
in Millions of Dollars
after a Doubling in Price, in Respect to
Cigarettes Sold in Ontario Only

	Present (1982)	*Ontario Government only Raises Tax*	*Ontario and Federal Governments Raise Tax*
Ontario government	343	650	421
Federal government	322	171	400
Total	665	821	821

Presently, according to an Ontario government source, "taxes are not levied as a means to deter smoking" (A Report on policies and legislation of the Government of Ontario, 1981). The Tobacco Tax Act (1980) is silent on this point. Section 2(1) of the act specifies the consumer taxes on various forms of tobacco. Presently the tax on cigarettes is set at "36.8 per cent of the taxable price". The "taxable price" is ascertained by a quarterly survey of 400 retail outlets. The necessary change in legislation would involve repealing the notion of "taxable price" (introduced in 1981) and restoring the per-cigarette formula that

prevailed before, setting the amount of tax per cigarette in such a manner as to ensure a doubling in current retail price, meanwhile providing for increases in the new rate to keep pace with inflation.

Only one survey appears to have investigated attitudes towards passing and implementing the kind of legislation that would seek to discourage cigarette use by raising taxes enough to cause a substantial increase in price. In this study, prepared for Health and Welfare Canada and published in 1981 (Goldfarb, 1981), 506 smokers and 473 non-smokers were asked "To encourage a generation of non-smokers, would you support legislation to increase the price of cigarettes through taxes to discourage smoking?". Close to 27% of the smokers and 59% of the non-smokers said that they would support such legislation. Adjusting for the prevalence of smoking in the adult population, it can be estimated that some 51% of adults with an opinion on the matter would support a substantial tax increase for the purpose of discouraging smoking, especially among young people. The study suggested that, among 10–18 year olds, some 68% of those with an opinion would support this kind of legislation.

Who Would Be Affected?

Harris (1980) estimated that the price elasticity of demand for cigarettes in the U.S. is higher for light smokers than for heavy smokers. Specifically, he found that for smokers using more than 30 cigarettes a day it was –0.36: The overall mean was –0.44. Thus price increases would have a greater effect on those smokers whose habit is less dangerous. It would also, by the same reckoning, have a greater effect on young smokers, who smoke fewer cigarettes on average. In Canada, in 1979, whereas 33% of all cigarette smokers smoked less than 13 per day, among 15–19 year-olds 54% of smokers smoked this amount (Health & Welfare Canada, 1980).

Russell (1973) cited McKennell and Thomas (1967) to the effect that " the expense of smoking is a major disincentive, especially to the teenager". Peto (1974) added a similar comment, quoted near the beginning of this appendix. Joyce *et al* (1976) asked college students whether higher prices would make them cut down or quit smoking: a majority said that a 50% increase would have that effect. Pearson and Richardson (1978) found that 16-year-old British young people smoke according to their income, whether from earnings or pocket money, suggesting that restricting the number of cigarettes that can be bought with a limited income would have a strong effect. A recent U.S. study (Lewit *et al,* 1981) estimated teenagers' price elasticity of demand as extraordinarily high (–1.4), with almost all of it (–1.2) attributable to basic decisions of whether or not to smoke. In Canada, the proportion of smokers among 15–19 year olds increases with income more steeply than it does for adults other than those aged 65 and over (Health & Welfare Canada, 1980).

Thus, although the evidence is slight, there seems reason to believe that price hikes may be peculiarly effective in deterring and limiting childhood smoking.

However, if Harris (1980) is right, although a price increase would have less impact on the heavy smoker, usually adult, it would nevertheless have some ef-

fect. A heavy smoker might become a moderate smoker as a result of a doubling in price and could enjoy better health as a result (U.S. Surgeon General's Report, 1964). It is worth noting that in a 1976 survey of attitudes towards smoking conducted in Toronto (Sheppard & Labarre, 1976), 34% of smokers who had tried to quit said they were most concerned about future health, 29% said they were most concerned about the cost of smoking, and 24% said they were most concerned about current symptoms. If cigarette prices were doubled, the motivation to quit would likely also increase substantially.

Information presented in an earlier appendix suggests that in Ontario, as elsewhere, less well educated adults, especially males, smoke more on average even though they presumably earn less on average. A substantial increase in cigarette prices could thus be regarded as a tax on the poor, a factor that should be taken into account when price increases are being considered.

Differential Taxation

The WHO Expert Committee on Controlling the Smoking Epidemic has called for increased taxes on tobacco products as a means of reducing consumption (Masironi, 1980). It has also called for differential taxes, so that strong cigarettes are taxed more heavily.

There is already a differential federal duty in Canada: cigarettes weighing more than 1.361 grams each attract a slightly higher rate. Few cigarettes come into this category.

High-tar (>20mg) cigarettes were taxed at a higher rate in Britain from September, 1978. In March, 1981, the sale of such cigarettes had fallen to 0.03% of the market, and the tax was withdrawn.

Harris (1980) has summarized the question of differential taxation as follows:

> "If smoking a few high TN (tar and nicotine) cigarettes produces more health damage than smoking many low TN cigarettes, then the best policy is a prohibitively high tax on brands delivering more than 13–15 mg tar. If smoking many low TN cigarettes is more damaging, then the best policy is a relatively high, uniform tax on all brands. If health damage depends only upon total TN intake, then the best policy is to tax all brands, with a moderate price differential at 16–17 mg tar. This policy induces medium tar, filter-tip smokers to reduce their smoking frequency without switching to the lower TN brands".

Because we do not yet know what health damage depends on, although we can suspect, parsimoniously, that it might depend on total TN intake, the best strategy might be simply to raise the tax on all brands.

USING TOBACCO MORE SAFELY

There is little doubt that cigarettes are becoming safer. *Other things being equal,* people who smoke a pack a day of today's average cigarettes suffer less morbidi-

ty and mortality than did people who smoked a pack a day of the average cigarette of 20 years ago. The problem is that things are not equal. As Collishaw (1981) has demonstrated, smokers smoke more on average today. Also, it has been reported that weaker cigarettes (i.e., cigarettes yielding less tar and nicotine) are smoked more intensively than stronger cigarettes (Wald *et al,* 1980), suggesting that today's cigarettes are inhaled more deeply than the stronger cigarettes of 20 years ago. On average, nevertheless, it appears that smokers experience less morbidity and mortality than they used to, even after allowing for the increases in consumption and intensity of smoking (Hammond, 1979).

However, the picture is complicated. Moderate smokers seem especially inclined to increase their consumption when cigarettes are weakened (Garfinkel, 1979), meaning that a greater proportion of smokers may be at risk. Teenage females may have found it much easier to smoke because of the availability of weaker cigarettes (Silverstein *et al,* 1980). Many smokers seem to smoke low-yield cigarettes very intensively, to the extent that their nicotine plasma levels are higher than those of many smokers of high-yield cigarettes (Kozlowski *et al,* 1982). Some of this intensity results from conscious or unconscious blocking of ventilation holes that are included to allow dilution of inhaled smoke (Kozlowski *et al,* 1980).

In short, the move to safer cigarettes may be a mixed blessing — beneficial to most smokers but hazardous to many. The 1981 report of the U.S. Surgeon-General on the health consequences of smoking was made entirely on this topic (U.S. Surgeon-General's Report, 1981). It is a highly commendable review. It would be difficult to provide a better case for more research in this area than is provided in that report.

One of the authors of the 1981 U.S. Surgeon-General's Report made a submission to the Task Force (Kozlowski, 1981). The key paragraph was the following:

> "The 'less hazardous' use of tobacco includes several sub-topics, for example, the use of low-yield cigarettes, the use of smoke-less tobacco, and the reduced use of 'regular' cigarettes. Probably the oldest form of advice that physicians have given to un-reformed smokers is to 'at least cut down, if you can't quit'. Remarkably, there is almost no research that indicates how much 'cutting down' is needed before reduction in risks might occur. Does anyone really benefit from a shift to a lower-yield cigarette? How could the likelihood of benefits be increased? Do chemical additives influence the risks of low-yield cigarettes? How can the consumer be best informed about the actual risks of 'less hazardous' products? In short, I think that a great deal of research is needed to evaluate the proper role of 'less hazardous' tobacco use as a form of therapy for the smoking and health problem".

The 1981 U.S. Surgeon-General's Report included an overview of research recommendations arising from a June 1980 conference on "Research needs on low-yield cigarettes". A summary of the overview follows. The recommendations were not ordered. They were to the effect that research is required on:

1. . . . whether low-yield cigarettes change smoking behaviour, particularly in such a way as to increase exposure to tar and nicotine.
2. . . . whether there are measurable differences in morbidity between smokers of high- and low-yield cigarettes, particularly among pregnant women who smoke and their unborn children.
3. . . . specification of the exact amounts of potentially harmful constituents delivered by smoked cigarettes, including flavouring agents and other additives, and the trends in these amounts.
4. . . . how smokers smoke various cigarettes, and how, in consequence, cigarette smoke acts in the lung, conducted with a view to improving the design of smoking machines.
5. . . . what components of tobacco smoke encourage smoking, and how these components are changed by modification of the physical and chemical properties of leaf tobacco.

Non-Cigarette Forms of Tobacco Use

"Snuff would be an acceptable and less harmful substance for cigarette smoking" claimed a recent influential article in *Lancet* (Russell *et al,* 1980). The use of smokeless tobacco appears to be increasing, as does the interest in it (Gritz *et al,* 1981). As well as the trend to weaker cigarettes, the trend to smokeless tobacco (not covered in the 1981 Surgeon-General's Report) may be a mixed blessing and one that begs extensive research. Indeed, the volume of research on this topic is very small, and our ignorance great and deserving of further attention. Research is needed on the prevalence and hazards of smokeless tobacco use, and on the associated morbidity and mortality.

Non-tobacco forms of nicotine delivery also deserve research, particularly the use of nicotine chewing gum, which, according to the sole distributor, is being widely prescribed in Canada as an aid to quitting smoking.

Ontario's Role in Research in this Area

Because much of the work relevant to the evaluation of 'safer' cigarettes and alternatives to cigarettes already goes on in Ontario, it would be appropriate to focus resources in this direction, if it is assumed that the research is worthwhile. There are already two centres of research excellence that rely on public funding, in Waterloo (Labstat Inc.) and in Toronto (the Addiction Research Foundation). Fruitful collaboration between them has already occurred (Kozlowski *et al,* 1982). More should be encouraged to answer the many research questions listed above.

AVAILABILITY OF CIGARETTES TO MINORS

Although it has been well established that large numbers of young people in Ontario smoke (Health & Welfare Canada, 1980; Smart *et al,* 1981), almost nothing is known about how they obtain their cigarettes. An unpublished, informal study by the Federal government suggested that 80% of cigarettes used by

young Canadians are bought from stores by the young people themselves (Thornton, 1981). Yet most of the buying is against the law. In Ontario, under the Minors' Protection Act (1980) "No person shall . . . sell . . . to a child under eighteen years of age cigarettes, cigars or tobacco in any form" (Section 1.1).

In Australia, where a similar law exists, 45% of a sample 10–12 year olds were found to obtain their cigarettes from stores if they were regular smokers, but only 19% of those who were trying cigarettes (O'Connell *et al,* 1981). A British study found that, among 15 year olds, 63% of regular smokers purchased their own cigarettes, whereas only 14% of first cigarettes were bought (Revill *et al,* 1981).

Changing and enforcing legislation that restricts access to alcohol has been found to reduce alcohol use and problems resulting from use, particularly in the case of restrictions on sales for off-premise use (Macdonald *et al,* 1982), although the effect seems chiefly confined to occasional users (Wagenaar, 1981). There thus may be reason to suppose that enforcement of existing legislation respecting the sale of cigarettes might also reduce use, although, in light of the Australian and British research (O'Connell *et al,* 1981; Revill *et al,* 1981), it is unclear whether a greater effect should be predicted for occasional rather than for regular users.

A research effort in this area could prove fruitful, not only as a means of determining whether enforcement might be effective, and how it might be carried out, but also as a means of discovering more about the circumstances of childhood tobacco use, and thence its causes. According to one British study (McKennell *et al,* 1967), 70% of adolescents who smoked more than one cigarette became regular smokers and continued to smoke for about 40 years, although adolescents who did not become regular smokers by age 20 generally remained non-smokers. A Finnish study estimated that postponing the start of smoking by 10 years has the same effect on lung cancer incidence as cutting the proportion of those starting by half (Hakulinen *et al,* 1981).

Clearly the prevention of or postponement of smoking in young people could have a markedly beneficial effect on public health. Careful research might indicate that enforcing restrictions upon sales of cigarettes to minors could be a useful tool in the reduction of childhood smoking.

APPENDIX 3C

PREVENTION AND CHANGE PROGRAMS

Prevention and change programs vary in nature, the strength of the evidence supporting their use, and the role they potentially play as part of an overall smoking program. To provide a foundation for related recommendations in the Task Force Report, this section begins with a descriptive overview of the various program alternatives, followed by a critical analysis of the empirical literature bearing on the issues raised by the overview.

PROGRAM ALTERNATIVES

The range of possible program options for smoking is great. Variations can occur in program aims, the population the program addresses, the means of delivery of the program, and the program content.

Program Aims

Programs can aim to prevent the incidence of new smokers, or to reduce the prevalence of existing smokers. Among those who already smoke, a program can be designed either to *eliminate the behaviour entirely,* and thus eliminate further increased risk, or to *change the behaviour to reduce risk*. This reduced exposure, "less hazardous", or "safer smoking" might be achieved through *substance changes* (switching to lower tar and carbon monoxide cigarettes), through *behaviour changes* (reducing the number of cigarettes smoked per day, or reducing the yield of each cigarette by taking fewer puffs, inhaling less deeply, etc.), or a combination of the two. Because of this variation in behaviour changes, the term *"smoking change"* will be used to refer to both smoking cessation and reduced exposure smoking.

Program aims also vary with respect to expected effect within a given population. For example, a smoking prevention program might expect to have a direct, immediate, and measurable effect on smoking onset. However, equally valid but more limited aims might include increased knowledge and beliefs of smoking-related risks and benefits of non-smoking, increases in the value placed on non-smoking and health, changes in perceived social norms as they affect smoking onset, or increased skill in resisting the various social influences on smoking. Although available research suggests that all these precursors may be necessary to ensure non-smoking, a given program may emphasize one set of effects more than another.

Indeed, information regarding health consequences is especially emphasized in many existing programs offered by the Ontario Ministry of Health, statutory and voluntary foundations, and Health and Welfare Canada, as well as in the recommendations of such professional associations as the Ontario Hospital Association. These variations in aims have important implications for this analysis and evaluative research. Models of prevention and change stress multiplicity of influences. Programs with limited aims affect *necessary* conditions for prevention or change, without being *sufficient* by themselves. Two implications are: (a) the program should be judged with respect to its impact vis-a-vis its limited aims, and (b) the program should be conceptualized as *complementary* to other programs affecting equally necessary but different conditions, and as one ingredient in a comprehensive set of programs.

Program aims can vary with respect to the stage in the smoking onset or change process. For example, a smoking prevention program might aim to reduce the number of primary school children who experiment with smoking. Alternatively, the program might not concern itself with experimentation, but rather aim to reduce the number of experimenters who go on to become regular smokers. The available data do not make clear which is the preferred approach (Flay, d'Avernas, Best, Kersell, & Ryan, in press; Johnston, in press). In a similar way, some smoking change programs are designed to motivate smokers to begin changing their habits; others aim specifically to assist those who have already succeeded in quitting, to maintain their non-smoking status. In this case, the two kinds of program may be seen as complementary, serving different audiences.

The above program aims target the individual directly. Programs also can aim to affect individuals indirectly. Two such intermediate program aims can be identified:

1. To increase the positive influence of program providers; and
2. To increase the social support for non-smoking within Ontario.

Regarding the first of these aims, a variety of program options may affect providers. Guidelines for effective programming of various kinds can be made available. If individuals who serve as significant exemplars for a youth or adult population can be identified, programs can be designed to facilitate non-smoking among these exemplars, to encourage their active participation in smoking and health programs, and to increase their ability to significantly influence others in an appropriate and constructive manner. As a final example, a program might have as its goal the co-ordination of diverse programs offered to various groups within a defined community.

Regarding the second of the intermediate program aims, programs can also affect the influence of a social system. For example, professional associations have called for the discouraging of cigarette sales in hospitals. Rules within a school regarding the smoking practices of staff and students may have significant influence on smoking onset. Finally, since both smoking onset and smoking change are known to be very significantly influenced by a variety of social variables, programs designed to influence societal norms and practices with respect to smoking and non-smoking may play a significant role.

Program Population

The population a program addresses can vary. On a broad level, change programs typically are offered to an adult, smoker population; prevention programs to a youth, non-smoker population. Other options are possible. For example, cessation programs occasionally have targetted teenagers. Programs could target non-smoking adults, suggesting ways in which they can help smokers; parents might be the chosen population, since they influence their children with respect to smoking.

Programs also can be targetted to certain sub-groups. The rationale for this could be one of several, including (a) a relatively high level of risk (e.g. women using oral contraceptives, middle aged males at risk for coronary heart disease, workers exposed to synergistic risks), (b) a relatively high likelihood of significant program impact (e.g. school children in the high rate of onset age range, post myocardial infarction patients), (c) a relative ease of accessibility (e.g. change programs in the workplace, patients utilizing primary care facilities), or (d) a relatively clear and compelling mandate for action (e.g. pregnant women where the rights of the fetus must be considered, adults who serve as significant exemplars to children).

Program Mechanism

Programs can vary with respect to means of delivery, provider, and level of service. For example, a smoking change program may rely entirely on the print and electronic media, on face-to face contact between smokers and program providers either individually or in groups, or on some combination of the two. A smoking prevention program can be offered in the classroom, through youth organizations, or again with the mass media. Providers can range from the primary care physician or physician-extender, through volunteers or health educators offering a community smoking cessation program, to a self-help group in the workplace. Level of service can range from the provision of self-management materials or brief physician advice, to intensive, one-to-one counselling.

Program Content

The greatest variation occurs in program content. For example, a smoking cessation program may rely on small group process, provision of health consequence information, pharmacological regimen, hypnosis, behaviour modification, or any combination of these and other techniques. Choice of method is determined in part by the assumptions made about the nature of the task. For example, some smoking prevention programs are designed to improve self-concept and decision making skills, since these factors can influence smoking onset and health care practices in a broad way. Other programs focus on the much more specific interpersonal skills required to resist peer pressures to smoke. Decisions about program content also are influenced by consideration of smoking determinants and the reasons why individuals do or do not change. For example, some programs emphasize the addictive aspects of smoking; others focus on the social environment as it influences smoking and smoking change.

LITERATURE REVIEW AND CRITICAL ANALYSIS

Smoking Prevention

Several indicators support the importance of dealing with the problem of smoking via a preventive approach in youth:

1. Youth should be the target of prevention as opposed to adults, since the rate of onset in adults is negligible (Brown, Cherry, & Forbes, 1978).
2. The probability of childhood regular smoking (at least one cigarette, once a week) leading to a lifetime of smoking, and consequent increases in morbidity and mortality, is high (McKennell & Thomas, 1967; Salber, Freeman, & Abelin, 1968).
3. In addition to long-term health effects, smoking has also been linked with respiratory disorders in children. This association has come both from self-reports of children (Bewley & Bland, 1976; Bewley, Halil, & Shaith 1973; Cameron, 1972; Rush, 1974; Stanhope & Prior, 1975) and from clinical studies (Harrison, Mohler, Lewis, & Speir, 1979).
4. Delaying onset in itself may be advantageous. For example, a study summarized in the 1979 Surgeon-General's Report indicates that the mortality of those who smoked since they were 15 years old was found to be 50% higher than that of those who started smoking in their 20's and 200% higher than non-smokers.
5. The prevalence of smoking in youth has increased in recent years, and age of onset is decreasing (Brown, Cherry, & Forbes, 1978; Health and Welfare Canada Technical Report Series, 1977, 1979; U.S. Surgeon General's Report, 1979).
6. While cessation attempts in general have not enjoyed good success rates, recent, social-psychologically based smoking prevention programs have been effective in preventing, or at least delaying, the onset of regular smoking in adolescents (Botvin, Eng, & Williams, 1980; Evans, Rozelle, Maxwell, Raines, Dill, Guthrie, Henderson, & Hill, 1981; Hurd, Johnson, Pechacek, Bast, Jacobs & Luepker, 1980; McAlister, Perry, & Maccoby, 1979; Telch, Killen, McAlister, Perry, & Maccoby, in press).
7. The smoking habit, once established, is remarkably tenacious and difficult to change (Bernstein & McAlister, 1976; Best & Bloch, 1979; Hunt & Bespalac, 1974; Pechacek, 1979).

Traditional Smoking Prevention Attempts

Traditional smoking prevention attempts are of two types: school based campaigns, and large-scale public information campaigns. School campaigns typically use a combination of discussions, lectures, demonstrations, assemblies, posters, pamphlets, films, articles in the school paper, and resource people to impart *information* on the dangers of smoking. Thompson (1978), in a review of smoking prevention programs conducted between 1960 and 1976, concluded that these programs generally have had no significant impact on smoking habits.

Evans, Henderson, Hill, & Raines (1979) suggested that, aside from methodological problems making evaluation of such campaigns almost impossible, teacher implementation of these campaigns is problematic. They noted that teachers themselves often express a lack of confidence in their ability to effectively implement smoking education programs. The reader is referred to these two reviews for details of traditional approaches to prevention.

Since 1976, relatively few school-based *information* programs have been reported in the literature. One that deserves mention as a promising approach is the School Health Curriculum Project (SHCP) (Heit, 1978; Iammarino, Heit, & Kaplan, 1980). SHCP uses a variety of approaches designed for implementation from kindergarten through seventh grade, and it is focused on health rather than smoking specifically. A survey conducted with 8th grade students, 3 years after participation in SHCP, indicated that they smoked significantly less than their counterparts who received regular health education instruction (Iammarino et al., 1980). Methodological weaknesses preclude a conclusion that SHCP alone accounted for these differences, but the approach may have some promise.

Another approach with intuitive promise but no data-based support as yet, is exemplified by the current Muscatine Study (Lauer & Akers, 1980). Basic data on the correlates of adolescent smoking behaviour have been collected from over 2,000 12 to 18 year-olds. These data are currently being analyzed. Findings will form the basic for the development of a smoking education/prevention program, which will be implemented and evaluated for short and long-term effectiveness in preventing or delaying the onset of smoking among adolescents. A similar approach is occurring at Oregon Research Institute, where a smoking prevention program is being developed currently, using information collected on attitudes, social influences and situations which affect teenage smoking (Biglan, Severson, & Lichtenstein, 1980b).

In sum, while improvements in information programs may prove effective, or lead to programs which interact with others to produce significant effects, at present there is inadequate empirical support for such programs.

Large-scale public information and prevention campaigns that are not solely school-based also have failed to produce a significant impact on smoking. Bradshaw (1973) reviewed public information campaigns between 1960 and 1970, and concluded that in general, they produce no apparent effect. Pointing to the many limitations of these campaigns, such as inadequate follow-up evaluations, and failure to include comparison or control communications, Evans and his colleagues (1979) added to the criticisms of Bradshaw that these campaigns have been too broadly targetted: they have not reflected characteristics of what should be the prime target for such campaigns — children and adolescents.

The failure of traditional attempts to consider social and psychological processes leading to the adoption of the smoking habit often has been blamed for the lack of success of these programs. It follows directly from the empirical literature that onset is not caused by a single factor or event. Rather, a combination of factors, both psychological and social, deriving from many sources, interact to influence initiation. Recently, more research effort has gone into (a)

understanding these determinants of onset, and (b) evaluating programs based on the current understanding of major determinants of onset.

Determinants of Smoking Onset

Much research on the smoking onset process has not furthered our understanding because the question has been operationalized simplistically, and the research has been unsound methodologically:

1. Understanding the factors involved in the initiation of smoking is a complex endeavour demanding the utilization of diverse conceptualizations. This has begun to occur only very recently (Biglan, Severson, Bavry, & McConnell, 1980a; Flay *et al,* in press; McAlister, Krosnick, & Milburn, 1981), and few data supporting these conceptualizations have been reported thus far. These models characterize the prototypic influences on, and stages in, smoking onset (Flay *et al,* in press). Very briefly, (a) *information* about health consequences, if it is attended to, comprehended and accepted, may lead to (b) changes in *knowledge* and specific *beliefs* about smoking and its effects, which, through the (c) joint operation of *values* (e.g. health, being accepted by peers) and *expectancies* (e.g., "they will have a cure for cancer before I get it") may or may not lead to (d) *attitude* change. Negative attitudes towards smoking may prevent smoking onset if (e) perceived *social norms* favour nonsmoking and the child has the necessary (f) *coping skills* to resist significant social influences. Clearly, the process is complex and a successful program is likely to require a comprehensive, multifaceted approach.
2. Several classes of variables that may be related to onset and maintenance of smoking have been identified in the literature. For the most part, studies that have identified these variables have been cross-sectional in nature, thus not implying causation but rather only hinting at the causal processes involved. In addition, studies to date have discriminated only smokers from non-smokers, with no attempt to determine the potentially different antecedents for the different stages of smoking onset (e.g. preparation for initiation of smoking, initiation, repeated experimentation, regular smoking). Further to this criticism, discrimination of smokers and non-smokers has for the most part been based on self-report, with no attempt to validate or check its accuracy. For children especially, for whom smoking is a negatively sanctioned behaviour, this is a major drawback. The bias may not be great (Pederson, Sidney, & Lefcoe, 1977), but data are mixed (Pechacek, Luepker, & Pickens, 1980). Another drawback of past studies is that they rarely considered the role of biological variables, variables that are likely to be very important in determining the development of behaviour especially once the first cigarette has been tried (Jarvik, 1979). On the bright side, ongoing research of interventions for smoking, and ongoing studies of antecedents (e.g. Wong & McCarthy, 1979) have amended many of the above-mentioned methodological inadequacies of previous research, and also have a greater appreciation of the complex nature of smoking onset.

With the limitations of the research in mind, the following statements summarize the findings consistently reported in the literature. Further details are provided by Flay and his colleagues (in press), McAlister (McAlister *et al,* 1981), and Evans (Evans & Raines, in press).

1. Peer pressure is believed widely to be a significant causal factor in the initiation of smoking, and is reported often as the single most important variable contributing to the onset of smoking in children and adolescents (Evans *et al.,* 1979; Levitt & Edwards, 1970; Newman, 1970; Palmer, 1970; Pederson, Baskerville, & Lefcoe, 1981a,b; Pederson & Lefcoe, in press; Williams, 1971).
2. Parents who smoke clearly influence the smoking behaviour of their children. In families where both parents smoke, 22.2% of the boys and 20.7% of the girls are also smokers, compared to 11.3% and 7.6% where neither parent smokes (U.S. Surgeon General's Report, 1979). Like-sex influences seem to be stronger between parent and child for smoking onset. Finally, parents' attitudes towards their child's smoking may be as important as the parent's smoking behaviour (Flay *et al,* in press).
3. The smoking behaviour of older siblings has been implicated as a possible influence on younger children (Evans & Smith, 1980; Flay *et al,* in press; Williams, 1971).
4. The effects of mass media and advertising are *thought* to be significant influences on smoking, by supporting the use of cigarettes as a sign of maturity and autonomy (Dekker, 1977; Evans & Raines, in press; Fishbein, 1977; McAlister *et al,* 1979). No persuasive empirical evidence exists.
5. Socio-economic status and academic achievement appear to be negatively associated with smoking (Borland & Rudolph, 1975: Green, 1979; Johnson, Buchanan, & O'Malley, 1977).
6. Hundreds of studies have attempted to establish associations between personality variables and smoking. No personality variables have been found to discriminate reliably individuals who will begin to smoke from those who will remain non-smokers, although such concepts as self-esteem and risk-taking probably play a role in interaction with other factors (McAlister *et al,* 1981).

Social-Psychological Prevention Approaches

Recently, more research effort has gone into developing and evaluating smoking prevention programs based on current understanding of the major determinants of onset (Botvin & Eng, 1980; Botvin *et al,* 1980; Evans, 1976; Evans *et al,* 1978, 1979, 1981; Flay *et al,* in press; Hurd *et al,* 1980; McAlister *et al,* 1979; McAlister, Perry, Killen, Slinkard, & Maccoby, 1980).

A common element of these programs is the "social influences curriculum", where information on the three major social influences to smoke — peers, parents, and the media — and how to resist these pressures, is imparted or actively elicited. Also common is an emphasis on immediate rather than long-term health and social consequences of smoking, and the use of same age peers on video-tape

to impart information. These programs typically are given to Grade 6 or 7 students, before smoking is firmly established but when students are expected to begin experimenting or to be exposed to pressures to smoke. Features of some but not all of these programs include: active role playing for pressure-resistance skill development; decision making and public commitment regarding smoking; use of *recognized* peers (i.e. acquaintances) on videotapes to impart information; use of peer leaders to implement the program; and booster sessions in later grades.

The typical impact of these programs is reflected in a rate of smoking onset in the experimental group of approximately half that in the control group, at nine months after pretest. These effects appear to be maintained for up to at least 3 years, the longest reported follow-up to date (Evans *et al,* 1981; Telch et al, in press). While each study using a social psychological approach has had some problems with methodology, the consistent findings of these studies in combination provide good support for the efficacy of this approach, at least in the short-term, and preliminary indications exist that effects are maintained. Validation of self-report or use of a bogus pipeline technique in most of these studies rule out the possibility that these effects are the result of a measurement bias (individuals in experimental groups being more likely to report falsely non-smoking because of the greater attention they receive than individuals in control conditions).

More research is required, however, before this approach is ready for implementation into school curricula, as many questions remain unanswered:

1. *Will the effects be maintained over time?* Data reported 3 years after pretest (Evans *et al,* 1981) indicated that by Grade 9 the number of smokers will still lower in the experimental group than in the control group (9.5% versus 14.2%) but the number of smokers in the experimental group has increased from Grade 8 (5.5%) to Grade 9 (9.5%). This suggests that the program may only delay onset, the program should follow individuals through the entire onset period of Grade 6 or 7 through to Grade 10 or 11. On the other hand another three year follow-up (Telch *et al,* in press) shows no diminuation in the treatment effect.
2. *What is working, and how?* Very few process data have been collected in an attempt to discern what components of the program have an impact on what variables, to lead ultimately to smoking prevention.
3. *How is impact affected by dissemination and what are the optimal strategies for dissemination?* To date, with few exceptions (Beaglehole *et al.,* 1978; Botvin *et al.,* 1980), programs have been disseminated by, and peer leaders trained by, project staff. Whether these programs can be implemented effectively by local school staff or community health personnel is an important question to answer if such programs are to become part of school curricula. Other dissemination variables may also affect impact. For example, all of the programs reported have at least a pretest and post test measurement. It is unknown whether this measurement is an important component of the treatment, being partially responsible for program effects, or whether this component can be eliminated upon incorporation of

the program into school curricula. More generally, it is unknown how much flexibility in application of the protocol can be tolerated before impact decays. Expert opinion suggests that well-developed and standardized programs probably *are* necessary to be effective (Flora, 1981; Perry, 1981).

Research along these lines is being conducted. For example, several of the ongoing projects plan at least three year follow-ups. The Waterloo Smoking Prevention Project has collected extensive process data and it is designed to address dissemination issues (Best & Brown, 1981, a, b; Flay *et al,* in press). At this point conceptual models for smoking prevention, and analyses of common ingredients in effective programs, provide preliminary guidelines for program planning (Flay *et al,* in press; Johnston, in press).

Smoking Change

Major recent reviews of smoking change and related research are available (Best & Bloch, 1979; Creswell, Stone & O'Rourke, 1979; Glasgow & Bernstein, 1981; Kozlowski, 1979; Schwartz, 1978). This analysis will focus on research surrounding the program alternatives identified.

Program Aims

Cessation versus Reduced Exposure

There are no direct comparisons of cessation versus reduced exposure. We have no data on the relative preference of smokers for the two aims, factors which might influence decisions in this regard, the relative short and long-term effectiveness of programs targetting one aim or the other, appropriate ways in which the two aims might be seen as complementary or sequential, or the nature and degree of relative risk reduction which might be expected for different populations when the aims are achieved.

However, relevant data are beginning to become available. Frederiksen (Frederiksen, Miller & Patterson, 1977; Frederiksen, Peterson, & Murphy, 1976) distinguishes between rate, substance, and topography as dimensions of smoking behaviour. Rate typically refers to numbers of cigarettes smoked per day, and substance of the tobacco product consumed and more specifically, the normal delivery of key constituents. Topography refers to the physical characteristics of the smoking behaviour itself; for example, the amount of time spent smoking a cigarette, the number of puffs taken, and the duration or depth of those puffs.

1. *Smoking Rate*

Cessation clinics typically have reported "all or nothing" outcomes — smokers either quit entirely or soon return to their habitual smoking rates. Why this might occur is unclear. Until recently, most models of addictive behaviour advocated abstinence as the only appropriate goal for treatment, although recent research with controlled drinking questions this assumption (cf. Maisto & Schefft, 1977). The typical "all-or-nothing" treatment outcome might relate to

factors mediating habitual smoking, the choice of treatment techniques based on assumptions about the nature of addiction, the strong expectancies of failure in the event of any smoking which often are explicitly instilled in clinic clients, or specific characteristics of those clients who elect to come to smoking clinics. There are exceptions to the all-or-none rule, with some clinics reporting up to 30% long-term maintenance of significantly reduced smoking rates in addition to cessation effects (Lando, 1980; Pomerleau, 1979). When controlled rate is specifically targetted, the incidence of six-month follow-up rates reduced by at least half has been as high as 70% (Frederiksen *et al*, 1976).

In sum, the assumption that sustained reduced rates cannot be achieved seems questionable. Preliminary studies suggest some promise for rate reduction programs but samples are small and unrepresentative, the treatment methods have not been developed fully, and really nothing is known about the feasibility and desirability of rate reduction programs at the community level.

2. *Substance*

Reduced exposure might be achieved by switching to brands with lower yields of risk producing constitutents, notably tar and carbon monoxide. Two key issues must be addressed: (a) does brand switching reliably lead to reduced exposure to these constituents, and (b) what balance of constituents will produce optimal results in terms of behaviour change and risk reduction.

Brandswitching does not lead reliably to reduced exposure, as noted in the Marketing analysis. Smokers may compensate for substance changes, presumably with rate and/or topography changes. It is not clear what factors may lead to compensation, nor is it clear how prevalent the phenomenon is. Some studies have found it while others have not. Martin and Prue (1979) argue that compensation is not found when the subject population is motivated for behaviour change. A major methodological problem in this area is that actual exposure is measured infrequently. The nominal values for a cigarette, determined with machine-smoking procedures, do not predict human exposure (see Marketing).

Russell (1977) has argued that an ideal cigarette in this context is one low in risk-producing constituents (e.g. tars, carbon monoxide) but at least moderately high in dependence-related constituents (i.e. nicotine). Such a cigarette will deliver sufficient doses of nicotine so that behavioural compensation might be unlikely to occur.

3. *Topography*

An alternative to these product changes recommended by Russell, is behavioural intervention designed to prevent compensation. Frederiksen and his colleagues (1977) demonstrated that significant changes in topology can be produced reliably in the laboratory. Whether these behavioural effects can be generalized to the natural environment and maintained remains to be shown. If they can, programs using these procedures might be of value with or without concommitant substance or rate changes.

Expected Program Effects

The conceptual model for the attitude-behaviour change process involved in prevention can be applied equally well to a change sequence, identifying important influences at each stage. Obviously, the information/knowledge/belief/ expectancy/attitude/social environment/skill relationships in the process can be very complex, and vary considerably from one smoker to another. It seems reasonable conceptually to argue that:

1. complex programs may be required.
2. more than one program may be necessary to facilitate change at the various steps in the process.
3. a given smoker may need each program at varying points in time, since the entire change process may extend over years.
4. programs can vary legitimately with respect to expected effects. A program which facilitates change at one stage in the process may be judged effective if it produces a measurable effect on the mediating variables characterizing that stage, whether or not it produces an immediate change in smoking behaviour.
5. a *comprehensive* program for smoking change should include component programs which address all important stages, and should be evaluated with respect to *behaviour* change over time.

Empirical support for this analysis is fragmentary and equivocal. For example, controlled evaluations suggest clearly and consistently that information about health consequences affects *knowledge* and sometimes *attitudes*, but has little enduring effect by itself on smoking *behaviour* (Best & Bloch, 1979; Pechacek, 1979). However, the implications of these findings are not so clear. Epidemiological data show significant decreases over the past two decades in the prevalence of adult smoking. It seems most improbable that increased public knowledge of health consequences has not played a significant role. Furthermore analysis of cigarette demand functions suggests substantial changes which seem in part attributable to periods of intensive information campaigns (Warner, 1977).

The uncertain effects of information raise serious questions for many current smoking change programs. There are two general issues. First, the aims of many programs may be too narrow. Provision of health information and tips about quitting may serve a useful role. However, it will not be sufficient alone to produce change in most smokers. Programs must either (a) broaden their aims and methods to permit significant impact on the full range of stages in the change process, or (b) link with complementary programs or services which will combine to affect the full range. There are no clear tests of the effectiveness of comprehensive programming, but recent community studies come close. For example, the Stanford Heart Disease Prevention Project (Farquhar, Maccoby, Wood, Alexander, Breitrose, Brown, Haskell, McAlister, Meyer, Nash, & Stern, 1977) found a significant population impact on smoking only when intensive media programming was combined with face-to-face group counseling for high risk smokers.

The Stanford Project deserves special mention because it was the first to provide large-scale tests of programs based on current behaviour science and communication findings and theory. In the first Three Community Study, towns were randomized to receive over a three-year period, no program, a mass media program, or a mass media program plus face-to-face counseling for high risk residents. Programs targetted more than one coronary risk factor, but the finding that a significant population impact on smoking was achieved in the media plus counseling condition is encouraging. The Stanford Project suggests several principles relevant to the present context, including:

1. The importance of comprehensive programming.
2. The utility of large studies to evaluate co-ordinated programs at the community level, to answer crucial issues with respect to program aims, as well as for other objectives.
3. The desirability of integrating program development, community organization, and dissemination and evaluation.

The second issue is methodological. Evidence from controlled studies contrasts sharply with epidemiological data — what are we to believe? If indeed information programs may have highly variable, considerably delayed, and complex interactive effects, then our current evaluation paradigms seem inadequate. More satisfactory models for the evaluation of many community programs need to be developed.

Stages in Smoking Change

The attitude and behaviour change sequence described can be especially detailed at some points, and research findings clearly indicate that such detail is crucial. For example, initial cessation seems quite distinct from the maintenance of smoking cessation (Bernstein, 1969; Bernstein & McAlister, 1976; Best, Owen, & Trentadue, 1978). Quite different processes are involved at each point, and different program techniques seem indicated. The large amount of literature on smoking cessation programs makes it very clear that success at the initiation stage is far easier to achieve than successful long-term maintenance. Yet there is an overwhelming imbalance in research and program delivery activity, the vast majority of effort being devoted to initiation of change!

Research in this area has been severely hampered by two problems. First, although there is reasonable evidence describing the course of relapse (cf. Hunt & Bespalac, 1974) — suggesting that typically three-quarters of initially successful abstainers relapse within the first three months following a program — there are almost no data characterizing the circumstances and reasons associated with relapse. Research is beginning (e.g. Best, 1980; Lichtenstein, Antonuccio & Rainwater, 1977; Marlatt & Gordon, 1980), but until much more is known about the causes of relapse, it will be more difficult to design effective program strategies. At the same time, it is true that theoretical models describing relapse are being developed (cf. Marlatt & Gordon, 1980), and a few programs have shown reduced relapse (e.g. Best et al., 1978; Best, Bass, & Owen, 1977; Dubren, 1977; Lando, 1980).

The second problem has been the lack of data characterizing the smoking change process as a whole, and effective strategies at each stage. An estimated forty million North Americans have stopped smoking, large numbers have switched to lower tar delivery cigarettes, and yet almost nothing is known about the problems which typically occur at each stage, factors differentiating successful from unsuccessful changers, or the methods employed by successful changers. Again, theoretical models are beginning to emerge (cf. Best, 1978; Schlegel, d'Avernas, & Best, 1980), but process evaluations of smoking change programs are not available.

Research in both areas must be a high priority if more effective change programs are to be developed. The undertaking will be challenging, for both typical change process and causes of relapse can be expected to vary as a function of both individual differences (e.g. motivation, nicotine dependence, environmental supports) and characteristics of the change program itself.

Program Population

Smoking change programs have been targetted primarily at adults. There has been concern that change programs should be developed for adolescents as well, but there are no data describing the actual demand for such programs, nor is there any empirical evidence that special programs for adolescents are needed over and above those available to adults. There are no change programs which have been adequately evaluated with adolescent populations.

Smoking change programs have targetted smokers themselves almost exclusively. However, there are compelling theoretical arguments for the inclusion of significant others in change programs, as well as data showing significant benefits in other health behaviour change areas. Ancillary programming for non-smokers might well augment the impact of change programs for smokers but there are no data.

The concept of targetting programs to homogeneous subgroups of smokers has become extremely popular among program providers in the past few years. The concept has far ranging implications for research and development. Targetting may affect program (a) recruitment, (b) implementation, (c) process, and (d) outcome, any of which effects might provide sufficient justification. The appropriate test of the relative value of targetted programs should involve comparison of the best available generic program for a particular setting, with a specially developed program for a sub-population in that setting. For example, a program especially designed for pregnant women might be compared to a more general physician counseling procedure, in a primary care setting. Evaluation would need to consider the full range of ways in which targetted programs may show a relative advantage, not simply program outcome. Targetted programs may provide an advantage in some settings with some populations, but not in others. To date, no empirical evaluations have been conducted of the relative impact of targetted programs.

Two similar concepts relate to program population. First, programs can be tailored to characteristics of the *individual* as well as a sub-group. For example, special programs might be required for smokers who are especially anxious

(Pechacek, 1976), or for those dependent on nicotine effects. Researchers have found significant relationships between individual difference variables and program outcome, but studies are not consistent, and in the cases where a significant effect is demonstrated, the magnitude of the effect is typically small and of little practical value (Best, 1978).

An alternative to targetting programs based on individual differences is to vary a given program in response to the needs of the individual. Many programs are delivered flexibly, so that the procedures actually used with a given smoker in the program vary considerably. "Cafeteria" treatment, where the smoker selects preferred components in a program, is characteristic of several efficacious cessation programs (e.g. Best *et al.*, 1978; Elliot & Denny, 1978; Pomerleau, Adkins, & Pertchuk, 1978), but the advantage of such tailoring has not been tested empirically. The relative merits of flexible versus standardized program delivery can be argued both ways, and experimental tests of these variations are important.

The final concept relevant to program population concerns the *sequencing* of programmatic efforts over time within a given population (Best, 1978; Shewchuk & Wynder, 1976, 1977). When smokers first make contact with the health care system, the program response might be minimal, relying heavily on the smoker's own efforts and abilities. However, if this change attempt is unsuccessful, successive programs should provide increasingly intensive assistance. A key concern is *continuity*. If smooth progress through increasingly more intensive programs can be assured, this hierarchial service model has major cost-benefit implications, and may increase very significantly the overall probability of successful change for a given smoker. There are no empirical tests of the effectiveness of hierarchical programs, and the difficulties associated with the design and evaluation of such services are daunting. Nevertheless, the striking increase in effectiveness with continuity of care and repeated contacts found in some large community risk factor reduction trials (e.g. Benfari, 1981; Farquhar *et al.*, 1977) argue that the effort may be warranted.

In summary, individual and group differences represent an extremely important area for future research. The available data are very limited, but several encouraging findings can be identified. The design of controlled trials to compare generic and specially designed programs in a given setting is quite feasible, although interactions with program content, population, and setting differences make it likely that the weight of evidence demonstrating the advantages of targetted programs will develop only slowly over many studies.

Program Mechanism

Means of Delivery

Three broad means of delivery have been used most for smoking change programs: the print and electronic mass media, brief face-to-face counseling in primary care and similar settings where the purpose of visit is other than for smoking change *per se*, and more extended face-to-face counseling and group interaction typically in a community setting with smokers specifically recruited for smoking change.

There has tended to be an interaction between means of delivery and program content — the shorter the duration of face-to-face contact, the greater the reliance on health information and brief "helpful hints". Conversely, the more face-to-face contact, the greater the use of group interaction processes and training of coping skills as aids to change. Although not well documented, it seems probable that there also are major differences in the populations influenced by the three types of service, as a function of selectivity and other factors. Thus, direct comparisons between alternative means of service are very difficult.

The potential of the mass media is unclear. Most controlled evaluations suggest very limited impact when mass media alone are used, perhaps for the same reasons that evaluations of health information programs typically used show minimal effects. A few preliminary evaluations with *other* content are more promising. Community studies such as the Stanford Heart Disease Prevention Project have already been mentioned. Dubren (1977) found maintenance of cessation significantly increased by the provision of supportive recorded telephone messages. McAlister (1976) found videotapes as effective as live leaders in a group smoking cessation program. Best (1980), in an uncontrolled evaluation of a series of weekly television programs broadcast in conjunction with the availability of print self-help materials, found cessation levels comparable to those typically reported for face-to-face community programs. Health and Welfare Canada and the Canadian Cancer Society currently are developing and evaluating somewhat similar materials for wide-spread utilization (Evans, Nostbakken, Teasdale, & Barlett, 1981).

Use of print materials for self-help smoking cessation has been extensive. A wide variety of books and pamphlets is available to the public. Too few adequate evaluations are available (cf. Glasgow & Rosen, 1978) to suggest that these materials add significantly to the smoker's unaided efforts to change. Most that are available again suggest negligible effects. However, some very recent research evaluating more sophisticated procedures is encouraging (e.g. American Lung Association, 1981; Prue *et al.*, 1980).

The term "self-help" can be misleading. Print materials particularly often are offered in conjunction with limited face-to-face counseling. Thus, degree of counselor or group assistance in fact is on a continuum. The distinction may be critical if indeed minimal professional involvement can make a largely mediated program effective. For example, one study found the provision of print instructions and audio tape adjuncts effective when offered with minimal counselor contact (Danaher, Jeffery, Zimmerman, & Nelson, 1980). One highly efficacious program combined a limited number of group meetings with a variety of procedures to be completed in the home and other settings between sessions (Best *et al.*, 1977, 1978). Preliminary results indicate that reliance on a commercially available manual may be a useful approach (e.g. Pederson, Baldwin, & Lefcoe, 1981).

Adequate evaluations of various mediated programs are urgently needed, because of (a) the wide-spread utilization of programs of unknown effectiveness, (b) recent indications that such programs may be effective in some instances, and (c) major potential advantages of mediated programs. The poten-

tial availability and superior cost-effectiveness of such programs are two such advantages. There are intrinsic advantages as well. The majority of smokers wanting to quit apparently would rather not utilize face-to-face services (Gallup, 1974). Furthermore, there are theoretical bases (cf. Best, 1980; Davidson, 1978) and some preliminary empirical data which suggest that smoking change is more likely to be maintained if individuals attribute the change to their own efforts.

To complement evaluations of mediated programs, we very much need to work to develop conceptual models for complementary use and combination of mass mediated, limited assistance, and more intensive face-to-face programming.

Given face-to-face programming, an important practical issue concerns the relative effectiveness of individual versus group counselling. There are almost no available data, and those there are conflict (Best *et al.*, 1977; Shewchuk, 1976).

Program Providers

There are almost no data on the effectiveness of program providers as distinct from the program itself. A few studies (Page, 1981; Pincherle & Wright, 1970; Russell, Wilson, & Baker, 1979) suggest significant variation in physician effectiveness, but there was too little standardization of the treatment protocol to attribute differences to provider effectiveness *per se*. A wide range of providers are used with change programs, from relatively untrained volunteers through to various health professionals including nurses, physicians, psychologists, health educators, and the like. While there are no persuasive studies to date, trained paraprofessionals seem as effective as professionals.

Research in this area is important. Alternative training models need to be developed and compared. Evaluations should contrast realistic alternatives within a given service context (e.g. physician versus physician extender in primary care, health professionals versus trained volunteers in community clinics). It is critical that program content and population be held relatively constant while comparing providers within a setting — a major shortcoming in previous studies. Obviously, inclusion of cost/effectiveness methods is important. Finally, outcome evaluations must be complemented by formative evaluations designed to develop effective training procedures, since well-defined effective procedures are not now available.

Program Content

The determinants of chronic smoking are complex and varied. We only partly understand the factors which control its occurrence. Change programs typically emphasize one set of determinants heavily and pay limited attention to others. Thus, consideration of the behaviour's determinants is an important first step in reviewing methods of change.

The pharmacological effects of nicotine certainly play a role (cf. Dunn, 1973). The effects of nicotine may interact with individual physiological differences in promoting smoking behaviour (Eysenck, 1973). Furthermore, a person's mood or affective state may determine smoking (Tomkins, 1966, 1968). There are social influences on smoking (Glad & Adesso, 1976; Ikard, Green, &

Horn, 1969; Mausner & Platt, 1971; McKennell, 1970, 1973; Russell, Peto, & Patel, 1974). As a result of the individual's learning history, smoking may be associated with a need to relax, to relieve boredom, or to have a reward. To a large extent, smoking occurs for no "good" reason at all. Rather, it occurs because it is a habit associated through experience with a wide variety of smoking situations, such as the end of a meal or a cup of coffee (Hunt & Matarazzo, 1970, 1973). Because it is an overlearned habit, smoking often occurs automatically such that the individual is unaware of whatever factors control his smoking behaviour (Hunt, Matarazzo, Weiss, & Gentry, 1979).

Thus, smoking is controlled by a diverse set of factors including pharmacological, environmental, affective, and cognitive cues and consequences. Smoking seems tied to a wide variety of specific situations (Best & Hakstian, 1978). The pattern of reasons for smoking varies considerably across individuals and is typically complex for any one smoker.

Approaches to Treatment

A bewildering range of smoking change techniques can be grouped roughly into six approaches: (1) group, (2) educational and attitude change, (3) individual counseling, (4) pharmacological, (5) hypnotic, and (6) behaviour modification.

Group Approaches. Group meetings are a popular context for smoking modification effects. They can be combined with a wide variety of specific content but may be broadly characterized as smokers coming together to receive help from clinic organizers and to help each other. Free discussion is common and it is assumed that the discussion *per se* (as well as the dynamics typically operative in small groups, i.e., encouragement, moral support and social pressure) may facilitate change. These factors are frequently augmented by health information and specific tips from the organizers. In general, the results of such clinics are quite consistent, suggesting long-term smoking cessation of between 15 and 25% (e.g. Evans & Lane, 1980; Guilford, 1972; Psyzka, Ruggles, & Janowicz, 1973). On occasion, long-term results have been nearer 30%. This may be associated with a major medical involvement in the clinic and/or inclusion of various specific change procedures (Delarue, 1973; Issacsson & Janzon, 1976; Kanzler, Jaffe, & Zeidenberg, 1976). Many of the group approaches have not been properly evaluated with appropriate controls. When waiting list or minimal treatment controls have been available, results suggest that the group approach may add little to the smoker's unaided efforts to quit. This does not mean that groups are of no value. The social context and interaction may well provide a vehicle for effective treatment. However, it does mean that group meetings must include effective content, perhaps drawn from some of the alternatives described below, if they are to promote change. It is important to note that one of the major methodological limitations in the smoking change area relates to the frequent evaluation of "techniques" rather than "curricula" (Thoreson & Coates, 1976; Schlegel *et al.*, 1980). We have lacked conceptual models for comprehensive treatment programs which include a mix of

techniques to address the various influences on smoking and diverse requirements for successful change. Recent data are consistent with the notion that such comprehensive curricula may be more effective. Thus, in considering the influence of group approaches on treatment outcome, and indeed with all the approaches which follow, it must be remembered that the lack of an effect does *not* imply that a technique might not play a significant role in interaction with other methods.

Education and Attitude Change Approaches. As already discussed, health behaviour change can be viewed as a process. First, the individual must become motivated to change. This can occur as the individual acquires information about the health risks associated with a behaviour, and accepts the degree of personal risk. Second, the individual must take action to change. The preliminary action of requesting help with smoking cessation does not assure that the individual is well motivated for change, since many clinic attenders express ambivalence towards quitting. Procedures which are educative and/or produce attitude change are important in this context.

Most research in this area has explored the effects of persuasive communications designed to produce fear about the health hazards of smoking. Typically, smokers have taken part in the role playing of a patient/physician interaction during which the smoker is given the distressing news that he has lung cancer and that surgery is indicated. The modal finding is that the procedure produces considerable fearfulness and attitude change but has little enduring effect on smoking.

Some recent data suggest that when attitude change techniques are combined with effective change procedures, the effects are additive and quite impressive (Best & Suedfeld, 1981).

Pharmacological Approaches. What are some of the direct ways of changing smoking behaviour? Consideration of the role played by nicotine in controlling smoking has led to two approaches. The first prescribes the nicotinomimetic lobeline sulphate, commercially available in buffered form as Bantron or Nikoban, during the initial withdrawal period. This can indeed reduce tobacco consumption, attesting to the role nicotine does play in smoking (Rapp, Dusza, & Blanchet, 1959). However, the effects are relatively weak and temporary, often no greater than those of placebos (Davison & Rosen, 1972; Edwards, 1964; Ford & Ederer, 1965; Jacobs, Spilken, Norman, Wohlberg, & Knapp, 1971; Merry & Preston, 1963).

The second approach is more recent. A nicotine- bearing chewing gum has been developed and evaluated in experimental, primary care and clinic contexts (Fagerstrom, 1980; Page & Walters, 1981; Raw, Jarvis, Feyerabend, & Russell, 1980; Russell, Wilson, Feyerabend, & Cole, 1976). The incremental effectiveness of nicotine- bearing chewing gum, in combination with physician advice or clinic procedures, argues for both the importance of considering nicotine dependence in change efforts and the value of the gum as one program component. However, further research is necessary to replicate early findings and to answer a variety of basic issues such as optimal dose; frequency and duration of use;

individual differences affecting response; and methods of improving the typically poor compliance.

Hypnotic Approaches. Outcome levels for the use of hypnosis with smoking vary dramatically, ranging from long-term cessation near zero to almost 100%. Most of the successful studies have combined hypnosis with a wide variety of other (poorly specified) procedures. A series of well-designed studies indicates that hypnosis alone is not effective (Pederson, Scrimgeour, & Lefcoe, 1975, 1979). Hypnosis is used for multiple purposes. Its use can parallel the fear-induction role described under Education and Attitude Change. If this is all it is used for, hypnosis would seem to be an ineffective technique. However, it is also used as an aid in teaching alternative behaviours in smoking situations, for example, other ways of dealing with tension, anger, or a desire to have something to do with one's hands (e.g., Watkins, 1976). As an adjunct to other behaviour change procedures, hypnosis may well make a contribution. There is a need for better controlled studies to evaluate the specific role of hypnosis and the circumstances under which it can be beneficial.

Individual Counseling. Most evaluations of individual counseling have been of brief contacts with physicians. Reviews suggest quite limited success in general (Lichtenstein & Danaher, 1978; Rosen, 1977). Russell and his colleagues (Russell *et al.*, 1979) reported small but significant effects for brief counseling in a randomized clinical trial involving 2,138 British smokers and 28 general practitioners. He argues that the effect, while small (5–10%), would result in an enormous population impact if similar procedures were routinely applied by all physicians. However, similar Ontario studies have not found comparable effects (e.g. Page, Walters, Schlegel & Best, 1981; Stewart & Rosser, 1982). Furthermore, physicians typically do *not* involve themselves with their patient's smoking, unless dramatic symptoms are present (Rosen, 1977; Rosen & Ashley, 1978).

The exception to the rule of limited physician effectiveness comes with some specific patient populations with current medical problems related to smoking (Pederson, 1981). Thirty to fifty per cent of patients hospitalized with their first myocardial infarction permanently stop after only routine advice (Pechacek, 1979). However, other patient populations such as those with chronic obstructive lung disease appear less responsive (Pederson, 1980).

Increase in symptoms caused by smoking is a major precipitant of unaided quitting (Pechacek, 1979). Many researchers continue to argue for a critical and unique role for the physician in smoking change (e.g. Indyke & Ellis, 1980; Lichtenstein & Danaher, 1978; Rosen & Ashley, 1978). However, the effectiveness of physician intervention remains unclear. Most previous trials have not capitalized on the more promising change strategies developed in other contexts, although such guidelines are available (e.g. Lichtenstein & Danaher, 1979). Clearly more research is indicated.

Behaviour Modification Approaches. Behaviour modification represents not one treatment procedure but a host of techniques bound loosely together by an allegiance to social learning principles. The range of specific techniques

evaluated in the literally hundreds of available studies includes self-monitoring, contingency contracting, environmental restructuring, cognitive change procedures, aversive conditioning, training in alternative behaviours, problem solving, and stress management. Initial results were discouraging (cf. Bernstein, 1969; Hunt & Matarazzo, 1973), but more recent studies suggest grounds for cautious optimism (e.g. Bernstein & McAlister, 1976; Best & Bloch, 1979; Glasgow & Bernstein, 1981; Lando, 1980; Lichtenstein & Danaher, 1976; Pechacek, 1979). These reviews provide excellent detail. For the present purposes, several points should be noted.

With one exception, single techniques prove ineffective. The exception involves aversive oversmoking. The most common form is called rapid smoking. It typically requires the smoker to sit down, at first once a day and then gradually less frequently, to chain smoke as many cigarettes as possible, taking puffs every six seconds (Lichtenstein, Harris, Birchler, Wahl, & Schmahl, 1973; Schmahl, Lichtenstein, & Harris, 1972). Clients are instructed to remain abstinent between sessions. Reports from well-controlled efficacy trials indicate up to 100% abstinence at the end of the program, and 60% at a six-month follow-up (Danaher, 1977). Follow-up for two to six years suggested continuing diminuation to some 35% (Lichtenstein & Penner, 1978), but the results are impressive nevertheless.

Several issues surround the use of rapid smoking. First, concerns have been raised about the medical safety of the technique, given its effects on the cardiovascular system in particular and the possibility of cardiovascular accident in certain smokers (cf. Hall, Sachs, & Hall, 1977; Horan, Hackett, Nicolas, Linberg, Stone, & Lukaski, 1977). However, the best evaluations available suggest that the risks are *not* as great as feared (Sachs, Hall, & Hall, 1978; Sachs, Hall, Pechacek, & Fitzgerald, 1979), and even safe with cardiovascular and pulmonary disease patients (Sachs, Hall, Sachs, Hall, & Moir, 1980). Another line of research promises to develop non stressful alternatives which may be reasonably efficacious (Danaher *et al.*, 1980; Hackett & Horan, 1978, 1979; Kopel, Suckerman, & Baksht, 1979; Tori, 1978). A second issue concerns the large number of individual sessions with the rapid smoking procedure as originally developed, and the resulting uncertain feasibility as a public health measure. However, demonstrations that a take-home group version can be as efficacious in the context of multifaceted program (Best *et al.*, 1977, 1978), and that a minimal contact print/audio tape version still has reasonable potency (Danaher *et al.*, 1980), suggest that more efficient variations on the procedure might be developed. Third, there are no satisfactory field trials of the procedure's (or indeed any promising procedure's) effectiveness (Lando, 1978). Some studies have made a point of sampling from the general community (e.g. Best *et al.*, 1977, 1978; Lando & McCullough, 1978) but used a research staff and setting; other studies have been done in community settings (Curtis, Simpson, & Cole, 1976) but with significant departures from standard procedures and poor results as a consequence.

A second promising trend is the strong showing of several treatment packages designed to provide more comprehensive consideration of the com-

plexity of smoking and change (Best *et al.*, 1977, 1978; Bornstein, Carmody, Relinger, Zohn, Devine, & Bugge, 1977; Brenglemann & Sedlmayr, 1975; Chapman, Smith, & Layden, 1971; Delahunt & Curran, 1976; Elliot & Denny, 1978; Lando, 1977; Pomerleau, Adkins, & Pertschuk, 1978). However, considerable work remains to refine the programs, to study variations in individual response, and to evaluate effectiveness in community settings. A major shortcoming has been the almost complete lack of continuing, programmatic research designed to extend from the experimental development of efficacious change programs through the complete dissemination process, including packaging of treatment materials, development and evaluation of staff training procedures, controlled clinical trials, and implementation and evaluation in ongoing, community settings. This lack of bridging between research and community largely is to blame for the failure of community programs to adapt successfully those principles and procedures which do show promise.

The recent promise of multifaceted treatment programs is encouraging, but caution must be expressed as to how far this research can progress if not shored up by more basic studies. There are major lacunae with respect to refined and integrated models of reasons for chronic smoking, typical processes of change, and comprehensive conceptual models to guide the development of change programs. While controlled dissemination and evaluation of promising methods to the community seems timely, even the best programs still are successful with not more than half their clients. A balance between basic and applied program development research must be maintained.

Conclusions

The general conclusion from this analysis of the literature is that there are grounds for cautious optimism, and indications are that effective programs can be developed in several areas. Program development seems to be at a demonstration project stage: smoking onset and change processes are well-enough understood to guide program design, significant results have been achieved in controlled studies of several kinds of intervention, and there is emerging consensus on important principles and necessary ingredients for programs at the community level. On the other hand, further development and evaluation are needed before wide-spread dissemination will be feasible, and continuing research is necessary in several areas. The Report outlines specific recommendations in the area of prevention, change and research. Recommendations 7 and 8 specify priority program development research in the prevention and change areas. Recommendation 10 calls for research to increase understanding of factors affecting smoking onset, maintenance and change processes as they relate to prevention and change programs. The rationale notes very basic questions which remain unanswered. In this area, barriers to funding are seen.

The Task Force has concluded that an increased understanding of smoking influences is very important, and that the necessary research is unlikely to occur unless it is encouraged actively. The research is both difficult to get funded and difficult to do. For example, the smoking onset process can only be studied adequately with large-scale longitudinal designs combined with more intensive, ex-

perimental research which provides in depth study of important influences. Such research is expensive and long-term; funding agencies have difficulty on both scores. Smoking processes are very complex, and the research must be complex as a consequence. A wide variety of questionnaire, interview, observational and physiological measures are required to describe fully the process involved. Much of the research must take place in field settings where these measures are hard to get. The complexity and breadth of the research mean that few individual researchers are in a position to design and conduct the studies. Thus, collaborative efforts are essential.

REFERENCES

Anderson, E.W., Andelman, R.J., Strauch, J.M., Fortuin, N.J., & Knelson, J.H. Effect of low-level carbon monoxide exposure on onset and duration of angina pectoris. *Annals of Internal Medicine,* 1973, *79,* 46–50.

Aronow, W.S. Effects of passive smoking on angina pectoris. *New England Journal of Medicine,* 1978, *299,* 21–24.

Aronow, W.S., Stemmer, E.A., & Isbell, M.W. Effective carbon monoxide exposure on intermittent claudication. *Circulation,* 1974, *49,* 415–417.

Atkinson, A.B., & Skegg, J.L. Control of smoking and price of cigarettes — a comment. *British Journal of Preventive and Social Medicine,* 1974, *28,* 45–48.

Australian Council on Smoking and Health. *Submission to the Western Australian Government calling for an end to all forms of promotion of tobacco products.* (1980).

Beaglehole, R., Brough, D., Harding, W., & Eyles, E. A controlled smoking intervention programme in secondary schools. *New Zealand Medical Journal,* 1978, *87,* 278–280.

Benfari, R.C. The Multiple Risk Factor Intervention Trial (MRFIT). III The model for intervention. *Preventive Medicine,* 1981, *10,* 426–442.

Bergler, R. *Advertising and cigarette smoking.* Berne, Switzerland: Hans Huber, 1981.

Bernstein, D.A. Modification of smoking behavior: An evaluative review. *Psychological Bulletin,* 1969, *71,* 418–440.

Bernstein, D.A., & Glasgow, R.E. The modification of smoking behaviour. In O.F. Pomerleau & J.P. Brady (Eds.), *Behavioral medicine: Theory and practice.* Baltimore: Williams and Wilkins, 1979.

Bernstein, D.A., & McAlister, A. The modification of smoking behavior: Progress and problems. *Addictive Behaviors,* 1976, *1,* 89–102.

Best, J.A. Targeting and self-selection of smoking modification methods. In J.L. Schwartz (Ed.) *Progress in smoking cessation.* New York: American Cancer Society, 1978.

Best, J.A. Mass media, self-management, and smoking modification. In P.O. Davidson & S. M. Davidson (Eds.) *Behavioral medicine: Changing health life styles.* New York: Brunner/Mazel, 1980.

Best, J.A., Bass, F., & Owen, L.E. Mode of service delivery in a smoking cessation programme for public health. *Canadian Journal of Public Health,* 1977, *68,* 469–473.

Best, J.A., & Bloch, M. Compliance in the control of cigarette smoking. In R.B. Haynes, D.W. Taylor, & D.L. Sackett (Eds.), *Compliance in health care.* Baltimore: Johns Hopkins University Press, 1979.

Best, J.A., & Brown, K.S. Smoking prevention in the schools: Program development. Renewal grant application to the Ontario Ministry of Health, 1981 a.

Best, J.A., & Brown, K.S. Smoking prevention in the schools: Program dissemination. Grant application to the Ontario Ministry of Health, 1981 b.

Best, J.A., & Hakstian, A.R. A situation-specific model for smoking behavior. *Addictive Behaviors,* 1978, *3,* 79–92.

Best, J.A., Owen, L.E., & Trentadue, B.L. Comparison of satiation and rapid smoking in self-managed smoking cessation. *Addictive Behaviors,* 1978, *3,* 71–78.

Best, J.A., & Suedfeld, P. Restricted environmental stimulation therapy and behavioral self-management in smoking cessation. Unpublished manuscript, University of Waterloo, 1981.

Bewley, B.R., & Bland, J.M. Academic performance and social factors related to cigarette smoking by children. *British Journal of Preventative and Social Medicine*, 1977, *31*, 18–24.

Bewley, B.R., Halil, T., & Snaith, A.H. Smoking in primary school children: Prevalence and associated respiratory symptoms. *British Journal of Preventive and Social Medicine*, 1973, *27*, 150–153.

Bewley, T.H. Smoking: The 16th and 17th century response. *International Journal of the Addictions*, 1973, *8*, 191–196.

Biglan, A., Severson, H., Bavry, B., & McConnell, S. Social influence and adolescent smoking: A first look behind the barn. Paper presented at the meetings of the American Psychological Association, Montreal, September 1–5, 1980 a.

Biglan, A., Severson, H.H., & Lichtenstein, E. Teen social behavior and the prevention of smoking. In *Ongoing Research in Smoking and Health: 1980 Directory*. Washington, D.C.: U.S. Government Printing Office, 1980 b.

Bockhoven, C., & Niessen, H.J. Amounts of oxides of nitrogen and carbon monoxide in cigarette smoke with or without inhalation. *Nature*, 1961, *192*, 458–459.

Bonham, G.S., & Wilson, R.W. Children's health in families with cigarette smokers. *American Journal of Public Health*, 1981, *71*, 290–293.

Borland, B.L., & Rudolf, J.P. Relative effects of low socio-economic status, parental smoking and poor scholastic performance on smoking performance among high school students. *Social Science and Medicine*, 1975, *9*, 27–30.

Bornstein, P.H., Carmody, T. P., Relinger H., Zohn, C.J., Devine, D.A., & Bugge, I.D. Reduction of smoking behavior: A multivariable treatment package and the programming of response maintenance. *Psychological Record*, 1977, *27*, 733–741.

Botvin, G.J., & Eng, A. A comprehensive school-based smoking prevention program. *The Journal of School Health*, 1980, *50*, 209–213.

Botvin, G.J., Eng. A., & Williams, C.L. Preventing the onset of cigarette smoking through life skills training. *Preventive Medicine*, 1980, *9*, 135–143.

Bradshaw, P.W. The problem of cigarette smoking and its control. *Journal of the Addictions*, 1973, *8*, 353–371.

Brengelmann, J.C., & Sedlmayr, E. Experiments in the reduction of smoking behavior. In J. Steinfeld, W. Griffiths, K. Ball, & R.M. Taylor (Eds.) *Smoking and health, Volume II: Health consequences, education, cessation activities, and governmental action*. Washington: U.S. Department of Health, Education, and Welfare, 1977.

Brown, K.S., Cherry, W.H., & Forbes, W.F. The smoking habits of Canadian school children. Unpublished manuscript, University of Waterloo, 1978.

Cameron, P., Kostin, J.S., Zako, J.M. Wolfe, J.D., Tighe, G. Oselett, B., Stocker, R., & Winton, J. The health of smokers' and non-smokers' children. *Journal of Allergy*, 1969, *43*, 336–341.

Cameron, P. Second-hand tobacco smoke: Children's reactions. *Journal of School Health*, 1972, *42*, 280–284.

Chapman, R.F., Smith, J.W., & Layden, T.A. Elimination of cigarette smoking by punishment and self-management training. *Behavior Research and Therapy*, 1971, *9*, 255–264.

Colley, J.R.T., Douglas, J.W.B., & Reid, D.D. Respiratory disease in young adults: Influence of early childhood lower respiratory tract illness, social class, air pollution and smoking. *British Medical Journal,* 1973, *3,* 195–198.

Colley, J.R.T., Holland, W.W., & Cockhill, R.T. Influence of passive smoking and parental phlegm on pneumonia and bronchitis in early childhood. *Lancet,* 1974, *2,* 1031–1034.

Collishaw, N.E. Is cigarette consumption declining? *Chronic Diseases in Canada,* 1981, *2,* 25–26.

Creswell, W. H. Jr., Stone, D.B., & O'Rourke, T.W. Adult education. In U.S. Department of Health, Education and Welfare. *Smoking and health: A report of the Surgeon General.* Washington, D.C.: U.S. Government Printing Office, 1979.

Curtis, B., Simpson, D.D., & Cole, S.C. Rapid puffing as a treatment component of a community smoking program. *Journal of Community Psychology,* 1976, *4,* 186–193.

Dahms, T.E., Bolin, J.F., & Slavin, R.G. Passive smoking: Effects on bronchial asthma. *Chest,* 1981, *80,* 530–534.

Danaher, B.G. Research on rapid smoking: Interim summary and recommendations. *Addictive Behaviors,* 1977, *2,* 151–166.

Danaher, B.G., Jeffrey, R.W., Zimmerman, R., & Nelson, E. Aversive smoking using printed instructions and audiotape adjuncts. *Addictive Behaviors,* 1980, *5,* 353–358.

Data Laboratories. *Report of a survey of Canadian attitudes toward smoking.* Data Laboratories, February 1978.

Davidson, P.O. Therapeutic compliance. *Canadian Psychological Review,* 1976, *17,* 247–259.

Davison, G.C., & Rosen, R.C. Lobeline and reduction of cigarette smoking. *Psychological Review,* 1972, *31,* 443–456.

Dawley, H.H. Jr. The discouragement and control of smoking in a hospital setting. Unpublished manuscript, 1981.

Dekker, E. Youth culture and influences on the smoking behavior of young people. In *Smoking and health: Proceedings of the 3rd World Conference on Smoking and Health.* USDHEW Publication No. (NIH) 77-1413, 1977, 381–392.

Delahunt, J., & Curran, J.P. Effectiveness of negative practice and self-control techniques in the reduction of smoking behavior. *Journal of Consulting and Clinical Psychology,* 1976, *44,* 1002–1007.

Delarue, N.C. A study in smoking withdrawal. *Canadian Journal of Public Health,* 1973, *64,* Smoking and Health Supplement, S5–S19.

Donahue, F.J. & Capshaw, V. The great smoking survey. *American Lung Association Bulletin* 1977, *63,* 2–5.

Doron, G. How smoking increased when TV advertising of cigarettes was banned. *Regulation,* 1979, *3,* 49–52.

Doron, G. *The smoking paradox: Public regulation in the cigarette industry.* Cambridge, Massachusetts: ABT Books, 1979.

Dubren, R. Self-reinforcement by recorded telephone messages to maintain nonsmoking behavior. *Journal of Consulting and Clinical Psychology,* 1977, *45,* 358–360.

Dunn, W.L. Jr. *Smoking behavior: Motives and incentives.* Washington, D.C.: Winston & Sons, 1973.

Edwards, G. Double-blind trial of lobeline in an anti-smoking clinic. *Medical Officer,* 1964, *111,* 158–160.

Eikeland, S. Hand-rolling in Norway's biggest "cottage industry". *World Tobacco,* 1980, *68,* 113–114.

Elliott, L.P., & Rowe, D.R. Air quality during public gatherings. *Journal of the Air Pollution Control Association,* 1975, *25,* 635–636.

Elliott, C.H., & Deney, D.R. A multi-component treatment approach to smoking reduction. *Journal of Consulting and Clinical Psychology,* 1978, *46,* 1330–1339.

Evans, D., & Lane, D.S. Long-term outcome of smoking cessation workshop. *American Journal of Public Health,* 1980, *70,* 725–727.

Evans, G.D., Nostbakkan, D., Teasdale, L., & Bartlett, J. *Mass mediated smoking cessation.* Ottawa: Health Promotion Directorate, 1981.

Evans, R.I. Smoking in children: Developing a social-psychological strategy of deterrence. *Journal of Preventive Medicine,* 1976, *5,* 122–127.

Evans, R.I., Henderson, A.H., Hill, P.C. & Raines, B.E., Current behavioral research in the control and prevention of smoking: A critical methodological review. In A.M. Gotto & R. Paoletti (Eds.) *Atherosclerosis Reviews,* Vol. 6. New York: Raven Press, 1979.

Evans, R.I., Henderson, A.H., Hill, P.C., & Raines, B.E. Smoking in children and adolescents — Psychological determinants and prevention strategies. In *Smoking and health: A report of the Surgeon-General.* Washington, D.C.: U.S. Government Printing Office, 1979 (DHEW Publication No. (PHS) 79–50066).

Evans, R.I., Rozelle, R.M., Maxwell, S.E., Raines, B.E., Dill, C.A., Guthrie, T.J., Henderson, A.H., & Hill, P.C. Social modeling films to deter smoking in adolescents: Results of a three-year field investigation. *Journal of Applied Psychology,* 1981, *66,* 399–414.

Evans, R.I. Rozelle, R.M., Mittlemark, M.B., Hansen, W.B. Bane, A.L., & Havis, J. Deterring the onset of smoking in children: Knowledge of immediate physiological effects and coping with peer pressure, media pressure and parent modelling. *Journal of Applied Social Psychology,* 1978, *8,* 126–135.

Evans, R.I., & Raines, B.E. Control and prevention of smoking in adolescents: A psychosocial perspective. In T. Coates & C. Perry (Eds.) *Adolescent health: Crossing the barriers.* New York: Academic Press, in press.

Evans, R.I., & Smith, C.K. Cigarette smoking in teenage females: A social-psychological-behavioral analysis and further evaluation of a model prevention strategy. Unpublished manuscript, University of Houston, 1980.

Eysenck, H.J. Personality and the maintenance of the smoking habit. In W.L. Dunn, Jr. (Ed.) *Smoking behavior: Motives and incentives.* Washington, D.C.: Winston and Sons, 1973.

Fagerstrom, K.O. Smoking cessation with behavior therapy and Nicorette. Paper presented to the Society of Behavioral Medicine, New York, Nov. 23–25, 1980.

Farquhar, J.W., Maccoby, N., Wood, P.D., Alexander, J.K., Breitrose, H., Brown, B.W. Jr., Haskell, W.L., McAlister, A.L., Meyer, A.J., Nash, J.D., & Stern, M.P. Community education for cardiovascular health. *Lancet,* 1977 (June 4), 1192–1195.

Fergusson, D.M., Horwood, L.J., Shannon, F.T., and Taylor, B. Parental smoking and lower respiratory illness in the first three years of life. *Journal of Epidemiology and Community Health,* 1981, *35,* 180–184.

Fishbein, M. Consumer beliefs and behavior with respect to cigarette smoking: A critical analysis of the public literature. In Federal Trade Commission Report to Congress: Pursuant to the Public Health Cigarette Smoking Act. For the Year 1976. Washington, D.C., 1977.

Flay, B.R., d'Avernas, J.R., Best, J.A., Kersell, M.W., & Ryan, K.B. Cigarette smoking: Why young people do it and ways of preventing them. In P. Firestone & P. McGrath (Eds.), *Pediatric behavioral medicine.* New York: Springer Verbig, in press.

Flora, J. Personal communication, 1981.

Ford, S., & Ederer, F. Breaking the cigarette habit. *Journal of the American Medical Association,* 1965, *194,* 139–142.

Frederiksen, L.W., Miller, P.M., & Peterson, G.L. Topographical components of smoking behavior. *Addictive Behaviors,* 1977, *2,* 55–61.

Frederiksen, L.W., Peterson, G.L., & Murphy, W.D. Controlled smoking: Development and maintenance. *Addictive Behaviors,* 1976, *1,* 193–196.

Gallup Opinion Index. Smoking in America: Public attitudes and behavior. *Gallup Opinion Index,* 1978, *155,* 1–30.

Gallup Opinion Index, Report #108, June, 1974, 20–21.

Garfinkel, L. Time trends in lung cancer mortality among non-smokers and a note on passive smoking. *Journal of the National Cancer Institute,* 1981, *66,* 1061–1066.

Garfinkel, L. Changes in the cigarette consumption of smokers in relation to changes in tar/nicotine content of cigarettes smoked. *American Journal of Public Health,* 1979, *69,* 1274–1276.

Glad, W.R., & Adesso, V.J. The relative effects of socially induced tension and behavioral contagion for smoking behavior. *Journal of Abnormal Psychology,* 1976, *85,* 119–121.

Glasgow, R.E., & Bernstein, D.A. Behavioral treatment of smoking behavior. In L.A. Bradly, & C.K. Prokop (Eds.). *Medical psychology: A new perspective.* New York: Academic Press, 1981.

Glasgow, R.E., & Rosen, G.M. Behavioral bibliography: A review of self-help behavior therapy manuals. *Psychological Bulletin,* 1978, *85,* 1–23.

Green, D.E. Youth education. In U.S. Public Health Service. *Smoking and health: A report of the Surgeon-General.* Washington, D.C.: Department of Health, Education, and Welfare, 1979.

Gritz, E.R., Baer-Weiss, V., Benowitz, N.L., van Vunakis, H., & Jarvik, M.E. Plasma nicotine and cotinine concentrations in habitual smokeless tobacco users. *Clinical Pharmacology and Therapeutics,* 1981, *30,* 201–209.

Goldfarb Consultants. Smoking and non-smoking: A study of Canadians behavior and attitudes. Health & Welfare Canada, Project #817010, 1981.

Gottier, P.L. No smoking in public places — the law is working. *American Lung Association Bulletin,* September, 1979.

Guilford, J.S. Group treatment versus individual initiative in the cessation of smoking. *Journal of Applied Psychology,* 1972, *56,* 162–167.

Hackett, G., & Horan, J.J. Focused smoking: An unequivocally safe alternative to rapid smoking. *Journal of Drug Education,* 1978, *8,* 261–266.

Hackett, G., & Horan, J.J. Partial component analysis of a comprehensive smoking program. *Addictive Behaviors,* 1979, *4,* 259–262.

Hakulinen, T., and Pukkala, E. Future incidence of lung cancer: Forecasts based on hypothetical changes in the smoking habits of males. *International Journal of Epidemiology*, 1981, *10*, 223–240.

Hall, R.G., Sachs, D.P.L., & Hall, S.M. Medical risk of rapid smoking. Paper presented to the annual meeting of the Western Psychological Association, Seattle, 1977.

Hamilton, J.L. The effect of cigarette advertising bans on cigarette consumption. In Steinfeld, J. et al. *Health Consequences, Education, Cessation Activities, and Government Action*. U.S. Department of Health, Education and Welfare. Publication No. 77-1413. 1977, 829–840.

Hamilton, J.L. The demand for cigarettes: Advertising, the health scare, and the cigarette advertising ban. *Review of Economics and Statistics*, 1972, *54*, 401–411.

Hammond, E.C. The long-term benefits of reducing tar and nicotine in cigarettes. In Gori, G.B., & Buck, F.G. *Safe Cigarette?* New York: Cold Spring Harbour Laboratory, 1979, 13–18.

Harke, H.P. The problem of "passive smoking". *Muenchener Medizinische Wochenschift*, 1970, *112*, 2328–2334.

Harke, H.P. & Peters, H. The problem of passive smoking. III. The influence of smoking on the CO concentration in driving automobiles. *Internationales Archiv fuer Arbeitsmedizin*, 1974, *33*, 221–229.

Harris, J. Taxing tar and nicotine. *American Economic Review*, 1980.

Harrison, G.N., Mohler, J.L., Lewis, L.A., & Speir, W.A., Jr. Peripheral airway function in healthy young smokers. *Lung*, 1979, *165*, 205–215.

Hasselblad, V., Humble, C.G., Graham, M.G., & Anderson, H.S. Indoor environmental determinants of lung function in children. *American Review of Respiratory Disease*, 1981, *123*, 479–485.

Health and Welfare Canada, *Smoking Habits of Canadians, 1965–1979*, 1980.

Heit, P. The School Health Curriculum Project: A promising approach to the teenage smoking problem. *International Journal of Health Education*, 1978, *21*, 282–285.

Hirayama, T. Non-smoking wives of heavy smokers have a higher risk of lung cancer: A study from Japan. *British Medical Journal*, 1981, *282*, 183–185.

Horan, J.J., Hackett, G., Nicholas, W.C., Linberg, S.E., Stone, C.I., & Lukaski, H.C. Rapid smoking: A cautionary note. *Journal of Consulting and Clinical Psychology*, 1977, *45*, 341–343.

Horvath, S.M., Dahms, T.E., & O'Hanlon, J.F. Carbon monoxide and human vigilance: A deleterious effect of present urban concentrations. *Archives Environmental Health*, 1971, *23*, 343–347.

Howland, K.E. U.K. smokers spurn tobacco substitutes. *Foreign Agriculture*, 1977, *15*, 6.

Hunt, W.A., & Bespalac, D.A. An evaluation of current methods of modifying smoking behavior. *Journal of Clinical Psychology*, 1974, *30*, 431–438.

Hunt, W.A. & Matarazzo, J.D. Habit mechanisms in smoking. In W.A. Hunt (Ed.) *Learning mechanisms in smoking*. Chicago: Aldine, 1970.

Hunt, W.A. & Matarazzo, J.D. Three years later: Recent developments in the experimental modification of smoking behavior. *Journal of Abnormal Psychology*, 1973, *81*, 107–114.

Hunt, W.A., Matarazzo, J.D., Weiss, S.M., & Gentry, W.D. Associative learning, habit, and health behavior. *Journal of Behavioral Medicine*, 1979, *2*, 111–124.

Hurd, P.D., Johnson, C.A., Pechacek, T., Bast, L.P., Jacobs, D.R., & Leupker, R.V. Prevention of cigarette smoking in seventh grade students. *Journal of Behavioral Medicine,* 1980, *3,* 15–28.

Iammarino, N., Heit, P., & Kaplan, R. School Health Curriculum Project: Long-term effects on student cigarette smoking and behavior. *Health Education,* 1980, *11,* 29–31.

Ikard F.F., Green, D.E., & Horn, D. A scale to differentiate between types of smoking as related to the management of affect. *International Journal of the Addictions,* 1969, *4,* 649–659.

Indyke, D., & Ellis, B. There's a leading role for physicians in helping smokers to quit. *American Lung Association Bulletin,* March, 1980, 2–6.

Issacsson, S.O., & Janzon, L. Results of a quit-smoking research project in a randomly selected population. *Scandinavian Journal of Social Medicine,* 1976, *4,* 25–29.

Jacobs, M.A. Spilken, A.Z., Norman, M.M., Wahlberg, G.W., & Knapp, P.H. Interaction of personality and treatment condition associated with success in a smoking control program. *Psychosomatic Medicine,* 1971, *33,* 545–556.

Jarvik, M.E. Biological influences on cigarette smoking. In U.S. Department of Health, Education, and Welfare. *Smoking and health: A report of the Surgeon General.* Washington, D.C.: U.S. Government Printing Office, 1979.

Jermini, C., Weber, A., & Grandjeau, E. Quantitative determination of various gas phase constituents of the side-stream smoke of cigarettes in the room air as a contribution to the problem of passive smoking. *International Archives of Occupational and Environmental Health,* 1976, *36,* 169–181.

Johansson, C.R., & Ronge, H. Acute irritation effects of tobacco smoke in the room atmosphere. *Nordisk Hygienisk Tidskrift,* 1965, *46,* 45–50.

Johnson, C.A. Untested and erroneous assumptions underlying anti-smoking programs. In T. Coates, A. Petersen, & C. Perry (Eds.). *Promotion of health in youth.* New York: Academic, in press.

Johnson, L., Buchanan, J., & O'Malley, P. *Drug use among American high school students,* 1975–1977. Rockville, MD: National Institute of Drug Abuse, 1977.

Joyce, A.M., O'Rourke, T.W., & O'Rourke, D.M. Assessment of the perceived impact of taxation upon smoking behavior. *Journal of Drug Education,* 1976, *6,* 231–240.

Kanzler, M., Jaffe, J.H., & Zeidenberg, P. Long- and short-term effectiveness of a large-scale proprietary smoking cessation program — A four-year follow-up of Smokender participants. *Journal of Clinical Psychology,* 1976, *32,* 661–669.

Kiernan, K.E., Colley, J.R.T., Douglas, J.W.B. & Reid, D. Chronic cough in young adults in relation to smoking habits, childhood environment, and chest illness. *Respiration,* 1976, *33,* 234–244.

Kopel, S.A., Suckerman, K.R., & Baksht, A. Smoke holding: An evaluation of physiological effects and treatment efficacy of a new nonhazardous aversive procedure. Paper presented at the Association for Advancement of Behavior Therapy, San Francisco, December, 1979.

Kozlowski, L.T. Psychosocial influences on cigarette smoking. In U.S. Department of Health, Education, and Welfare. *Smoking and health: A report of the Surgeon General.* Washington, D.C.: U.S. Government Printing Office, 1979.

Kozlowski, L.T., Frecker, R.C., Khouw, V., & Pope, M.A. The misuse of 'less hazardous' cigarettes and its detection: Hole-blocking of ventilated filters. *American Journal of Public Health,* 1980, *70,* 1202–1203.

Kozlowski, L.T., Frecker, R.C., & Lei, H. Nicotine yields of cigarettes, plasma nicotine in smokers, and public health. *Preventive Medicine,* 1982, *11,* 240–244.

Kozlowski, L.T., Rickert, W.S., Pope, M.A., & Robinson, J.C. A color-matching technique for monitoring tar/nicotine yields to smokers. *American Journal of Public Health,* in press.

Kozlowski, L.T., Rickert, W.S., Pope, M.A., Robinson, J.C., & Frecker, R.C. Estimating the yield to smokers of tar, nicotine, and carbon monoxide from the 'lowest-yield' ventilated filter cigarettes. *British Journal of the Addictions,* in press.

Lando, H. Issues and new directions in multifaced behavioral smoking intervention programs. In J.L. Schwartz (Ed.) *Progress in smoking cessation.* New York: American Cancer Society, 1978.

Lando, H. Behavioral treatments in the modification of smoking. In R.J. Daitzman (Ed.) *Clinical behavior therapy and behavior modification.* New York: Garland, 1980.

Lando, H.A., & McCullough, J.A. Clinical application of a broad-spectrum behavioral approach to chronic smokers. *Journal of Consulting and Clinical Psychology,* 1978, *46,* 1583–1585.

Lauer, R.M., & Akers, R. Smoking in school age children: The Muscatine study. In *Ongoing Research in Smoking and Health: 1980 Directory.* Washington, D.C.: U.S. Government Printing Office, 1980.

Laughhunn, D.J., & Lyon, H.L. The feasibility of tax-induced prices as a deterrent to cigarette consumption. *Journal of Business Administration,* 1971, *3,* 27–35.

Leeder, S.R., Corkhill, R., Irwig, L.M., Holland, W.W., & Colley, J.R.T. Influence of family factors on the incidence of lower respiratory illness during the first year of life. *British Journal of Preventive and Social Medicine,* 1976, *30,* 203–212.

Lefcoe, N.M., & Inculet, I.I. Particulates in domestic premises. II. Ambient levels and indoor-outdoor relationships. *Archives of Environmental Health,* 1975, *30,* 565–570.

Levitt, F.E. The TV cigarette ad. ban: Unexpected fallout. *World Smoking and Health,* 1977, *2,* 4–8.

Lewitt et al, The effects of government regulations on teenage smoking, *Journal of Law and Economic,* University of Chicago, December, 1981, *24,* 545–569.

Litchenstein, E., Antonuccio, D.O., & Rainwater, G. Unkicking the habit: The resumption of cigarette smoking. Paper presented to the annual meeting of the Western Psychological Association, Seattle, 1977.

Litchenstein, E., & Danaher, B.G. Modification of smoking behavior: A critical analysis of theory, research, and practice. In M. Hersen, R.M. Eisler, & P.M. Miller (Eds.) *Progress in behavior modification: Volume 3.* New York: Academic Press, 1976.

Lichtenstein, E., & Danaher, B.G. What can the physician do to assist the patient to stop smoking? In R.E. Brashear & M.L. Rhodes (Eds.) *Chronic obstructive lung disease: Clinical treatment and management.* St. Louis: C.V. Mosby, 1978.

Lichtenstein, E., Harris, D.E., Birchler, G.R., Wahl, J.M., & Schmahl, D.P. A comparison of rapid smoking, warm, smoky air, and attention-placebo in the modification of smoking behavior. *Journal of Consulting and Clinical Psychology,* 1973, *40,* 92–98.

Lichtenstein, E., & Rodrigues, M.P. Long-term effects of rapid smoking treatment for dependent cigarette smokers. *Addictive Behaviors,* 1977, *2,* 109–112.

Lyon, H.L., & Simon. Price elasticity of the demand for cigarettes in the United States. *American Journal of Agricultural Economics,* 1968, *50,* 888–895.

Macdonald, S., & Whitehead, P.C. Availability of outlets and consumption of alcoholic beverages. Addiction Research Foundation, Toronto, 1982, Substudy No. 123.

Levitt, E.E., & Edwards, J.A. Multivariate study of correlative factors in youthful cigarette smoking. *Developmental Psychology,* 1970, *3,* 5–11.

Markle, G.E., & Troyer, R.J. Smoke gets in your eyes: Cigarette smoking as deviant behavior. *Social Problems,* 1979, *26,* 611–625.

Marlatt, G.A., & Gordon, J.R. Determinants of relapse: Implications for the maintenance of behavior change. In P.O. Davidson & S.M. Davidson (Eds.) *Behavioral medicine: Changing health lifestyles.* New York: Brunner/Mazel, 1980.

Martin, J.E., & Prue, D.M. The effects of progressive reductions in cigarette nicotine content on smoking rate and carbon monoxide levels. Paper presented at the Association for Advancement of Behavior Therapy, San Francisco, December, 1979.

Maisto, S.A., & Schefft, B.K. The constructs of craving for alcohol and loss of control drinking: Help or hindrance to research. *Addictive Behaviors,* 1977, *2,* 207–217.

Masironi, R. Controlling the smoking epidemic — Guidelines proposed by a WHO Expert Committee. In Ramstrom, L.M. (Ed.). Smoking Epidemic 1980. Stockholm: Almqvist and Wiskell, 1980, 308–313.

Matthews, V.L., Bolaria, R. & Feather J. Smoking behavior and attitudes among members of the Canadian Public Health Association, University of Saskatchewan, April, 1976.

Mausner, B., & Platt, E.S. *Smoking: A behavioral analysis;* Toronto: Pergamon Press, 1971.

McAlister, A. Television as a medium for delivering behavior therapy: A pilot study of a televised smoking cessation program. Paper presented to the 10th annual meeting of the Association for the Advancement of Behavior Therapy, New York, December 5, 1976.

McAlister, A.L., Krosnick, J.A., & Milburn, M.A. Causes of adolescent cigarette smoking: Cross-sectional tests of a theoretical model. Unpublished manuscript, Harvard University, 1981.

McAlister, A., Perry, C., Killen, J., Slinkard, L., & Maccoby, N. Pilot study of smoking, alcohol and drug abuse prevention. *American Journal of Public Health,* 1980, *70,* 719–721.

McAlister, A.L., Perry, C., & Maccoby, N. Adolescent smoking; Onset and prevention. *Pediatrics,* 1979, *63,* 650–658.

McGuinness, T., & Cowling, K. Advertising and the demand for cigarettes: A reply. *European Economic Review,* 1980, *14,* 127–130.

McKennell, A.C. Smoking motivation factors. *British Journal of Social and Clinical Psychology,* 1970, *9,* 9–22.

McKennell, A.C. *A comparison of two smoking typologies.* London: Tobacco Research Council, 1973.

McKennell, A.C., & Thomas, R.K. Adults and adolescents smoking habits and attitudes. Government Social Survey. London: Ministry of Health, 1967.

McWhinnie, J.R., Ouellet, B., & Lance, J.M. *Health field indicators.* Ottawa: Health and Welfare Canada, 1976.

Merry, J., & Preston, G. The effect of buffered lobeline sulphate on cigarette smoking. *Practitioner,* 1963, *190,* 629–631.

Miller, R.H. Factors affecting cigarette consumption. Unpublished paper, U.S. Department of Agriculture, Economic Research Service, 1974.

Miller, R.H. Pricing out tobacco: Price as a factor in cigarette consumption. In J. Steinfeld et al (Eds.). *Health consequences, education, cessation activities, and government action.* U.S. Department of Health, Education, and Welfare, Publication No. 77-1413, 1977, 821-827.

Minors' Protection Act. Revised Statutes of Ontario, Chapter 293 (1980).

National Institute for Occupational Safety and Health, Department of Transportation, Federal Aviation Administration. *Health aspects of smoking in transport aircraft.* U.S. Department of Health, Education and Welfare, Public Health Service, Health Services and Mental Health Administration, 85, 1971.

Newman, J.M. Peer pressure hypothesis for adolescent cigarette smoking. *School Health Review,* 1970, *1,* 15-18.

Nuehring, E. & Markle, G.E. Nicotine and norms: The re-emergence of a deviant behavior. *Social Problems,* 1974, *21,* 513-526.

Non-Medical Use of Drugs. *Smoking habits of Canadians, 1965-1974: Technical report No. 1.* Ottawa: Health and Welfare Canada, 1976.

O'Connell, D.K., Alexander, H.M., Dobson, A.J., Lloyd, D., Hardes, G.R., Springthorpe, H.J., & Leeder, S.R. Cigarette smoking and drug use in schoolchildren 2. Factors associated with smoking. *International Journal of Epidemiology,* 1981, *10,* 223-231.

O'Connell, E.J., and Logan, G.B. Parental smoking and childhood asthma. *Annals of Allergy,* 1974, *32,* 142-145.

Page, A. *Smoking cessation in family practice: The effects of advice and nicotine chewing gum prescription.* Unpublished Master's thesis, University of Waterloo, 1981.

Page, A.R., Walters, D.J., Schlegel, R.P., & Best, J.A. Smoking cessation in family practice: The effects of advice and nicotine chewing gum prescription. Unpublished manuscript, University of Waterloo, 1982.

Palmer, A.B., Some variables contributing to the onset of cigarette smoking in junior high school students. *Social Science and Medicine,* 1970, *4,* 359-366.

Pearson, R., & Richardson, K. The smoking habits of 16-year-olds in the National Child Development Study. *Public Health,* 1978, *92,* 136-144.

Pechacek, T.F. Specialized treatments for high anxious smokers. Paper presented to the annual meetings of the Association for the Advancement of Behavior Therapy, New York, 1976.

Pechacek, T. Modification of smoking behavior. In U.S. Public Health Service. *Smoking and health.* Washington, D.C.: U.S. Government Printing Office, 1979.

Pechacek, T.F., Luepker, R.V. & Pickens, R.C. Advances in the measurement of smoking behavior. Paper presented to the annual meetings of the Society of Behavioral Medicine, New York, November 1980.

Pechacek, T.F., & McAlister, A.L. Strategies for the modification of smoking behavior: Treatment and prevention. In J.M. Ferguson, & C.B. Taylor (Eds.) *The comprehensive handbook of behavioral medicine: Volume 3.* New York: Spectrum, 1980.

Pederson, L.L. *Compliance with physician advice to quit smoking among patients with pulmonary disease.* Unpublished doctoral dissertation, University of Western Ontario, 1980.

Pederson, L.L. Compliance with physician advice to quit smoking: A review of the literature. *Preventive Medicine,* 1982, *11,* 71–84.

Pederson, L.L., Baldwin, N., & Lefcoe, N.M. Utility of behavioral self-help manuals in a minimal-contact smoking cessation program. *International Journal of the Addictions,* 1981, *16,* 1223–1239.

Pederson, L.L., Baskerville, J.C., & Lefcoe, N.M. Change in smoking status among school-aged youth: Impact of a smoking-awareness curriculum, attitudes, knowledge, and environmental factors. *American Journal of Public Health,* 1981, *71,* 1401–1404 a.

Pederson, L.L., Baskerville, J.C., & Lefcoe, N.M. Multivariate prediction of cigarette smoking among children in Grades Six, Seven, and Eight. *Journal of Drug Education,* 1981, *11,* 191–203 b.

Pederson, L.L., & Lefcoe, N.M. Multivariate analysis of variables related to cigarette smoking among children in Grades Four to Six. *Canadian Journal of Public Health,* in press.

Pederson, L.L., Scrimgeour, W.G., & Lefcoe, N.M. Comparison of hypnosis plus counselling alone, and hypnosis alone in a community service smoking withdrawal program. *Journal of Consulting and Clinical Psychology,* 1975, *43,* 920.

Pederson, L.L., Scrimgeour, N.G., & Lefcoe, N.M. Variables of hypnosis which are related to success in a smoking withdrawal program. *International Journal of Clinical and Experimental Hypnosis,* 1979, *27,* 14–20.

Perry, C. Personal communication, 1981.

Peto, J. Price and consumption of cigarettes: A case for intervention? *British Journal of Preventive and Social Medicine,* 1974, *28,* 241–245.

Pimm, P.E., Shephard, R.J., & Silverman, F. Physiological effects of acute exposure to cigarette smoke in asthmatics. *Federation Proceedings,* 1977, *36,* 606.

Pincherie, M.B., & Wright, H.B. Smoking habits among business executives. *Practitioner,* 1970, *205,* 209–212.

Pipes, D.M. Allergy to tobacco smoke. *Annals of Allergy,* 1945, *28,* 277–282.

Pomerleau, O.F. Behavioral factors in the establishment, maintenance, and cessation of smoking. In U.S. Department of Health, Education, and Welfare. *Smoking and health: A report of the Surgeon General.* Washington, D.C.: U.S. Government Printing Office, 1979.

Pomerleau, O.F. Why people smoke: A critical examination of current psychobiological theories on smoking. In P.O. Davidson and S.M. Davidson (Eds.) *Behavioral medicine: Changing health lifestyle.* New York: Brunner/Mazel, 1980.

Pomerleau, O.F., Adkins, D., & Pertschuk, M. Predicters of outcome and recidivism in smoking cessation treatment. *Addictive Behaviors,* 1978, *3,* 65–70.

Prue, D.M., Krapfl, J.E., & Martin, J.E. Brand fading: The effects of gradual changes to low tar and nicotine cigarettes on smoking rate, carbon monoxide, and thiocyanate levels. *Behavior Therapy,* 1981, *12,* 400–416.

Psyzka, R.H., Ruggels, W.L., & Janowicz, L.M. Health behavior change; Smoking cessation. Stanford Research Institute Research and Development Report, December, 1973.

Rapp, G.W. Dusza, B.T. & Blanchet, L. Absorption and utility of lobeline as a smoking deterrent. *American Journal of Medical Science,* 1959, *237,* 287–292.

Raw, M., Jarvis, M.J., Feyerabend, C., & Russell, M.A.H. Comparison of nicotine chewing gum and psychological treatment for dependent smokers. *British Medical Journal,* 1980, *2,* 481–482.

Repace, J.L., & Lowrey, A.H. Indoor air pollution, tobacco smoke, and public health. *Science,* 1980, *208,* 464–472.

Remington, R.D. Smoking: U.S. data base and trends. *Atherosclerosis Reviews,* 1980, *7,* 285–296.

Revill, J., & Drury, C.G. An assessment of the incidence of cigarette smoking in fourth year school children and the factors leading to its establishment. *Public Health,* 1981, *94,* 415–424.

Rickert, W.S., & Robinson, J.C. Yields of selected toxic agents in the smoke of Canadian cigarettes, 1969 and 1978: A decade of change? *Preventive Medicine,* 1981, *10,* 353–363.

Rose, G. Physician counseling and personal intervention. In J. Steinfeld, W. Griffiths, K.P. Ball, & R.M. Taylor (Eds.) *Proceedings of the Third World Conference on Smoking and Health,* (Volume 2). Washington, D.C.: U.S. Government Printing Office, 1977.

Rosen, C., & Ashley, M.J. Smoking and the health professional: Recognition and performance of roles. *Canadian Journal of Public Health,* 1978, *69,* 399–406.

Rosser, W.W. & Stewart, P. Smoking cessation in family practice. Paper presented at the the Canadian Family Physicians Conference, Vancouver, May, 1980.

Royal College of Physicians. *Smoking and Health.* New York: Pitman, 1962.

Rush, D. Respiratory symptoms in a group of American secondary school students: The overwhelming association with cigarette smoking. *International Journal of Epidemiology,* 1974, *3,* 153–165.

Russell, M.A.H. Changes in cigarette price and consumption by men in Britain, 1946–71: A preliminary analysis. *British Journal of Preventive and Social Medicine,* 1973, *27,* 1–7.

Russell, M.A.H. Smoking problems: An overview. In M.E. Jarvik, J.W. Cullen, E.R. Gritz, T.M. Vogt, & L.J. West (Eds.) *Research on smoking behavior.* Rockville, Md.: National Institute on Drug Abuse, 1977.

Russell, M.A.H., Jarvis, M.J., and Feyerabend, C. A new age for snuff? *Lancet,* 1980, 1, 474–475.

Russell, M.A.H., Peto, J., & Patel, U.A. The classification of smoking by factorial structure of motives. *Journal of the Royal Statistical Society, Series A,* 1974, *137,* 313–346.

Russell, M.A.H., Wilson, C., Feyerabend, C., & Cole, P.V. Effect of nicotine chewing gum on smoking behaviour and as an aid to cigarette withdrawal. *British Medical Journal,* 1976, *2,* 391–393.

Russell, M.A.H., Wilson, C., & Baker, C.D. Effect of general practitioners' advice against smoking. *British Medical Journal,* 1979, *2,* 231–235.

Rylander, R. Review of studies on environmental tobacco smoke. *Scandinavian Journal of Respiratory Disease (Supplement),* 1974, *91,* 10–20.

Sachs, D.P.L., Hall, R.G., & Hall, S.M. Rapid smoking: Physiological evaluation of a smoking cessation therapy. *Annals of Internal Medicine,* 1978, *88,* 639–641.

Sachs, D.P.L., Hall, R.G., Pechacek, T.F. & Fitzgerald, J. Clarification of risk benefit issues in rapid smoking. *Journal of Consulting and Clinical Psychology,* 1979, *47,* 1053–1060.

Sachs, D.P.L., Hall, R.G., Sachs, B.L., Hall, S.M., & Moir, T.W. Safety and efficacy of smoking therapy for patients with cardiovascular and pulmonary disease. Paper presented to the annual meeting of the Society of Behavioral Medicine, New York, November, 1980.

Said, J. Zalokar, Lellouch, J., & Patris. Parental smoking related to adenoidectomy and tonsillectomy in children. *Journal of Epidemiology and Community Health,* 1978, *32,* 97–101.

Salber, E.J., Welsh, B., & Taylor, S.V. Reasons for smoking given by secondary school children. *Journal of Health and Human Behaviour,* 1963, *33,* 710–715.

Schlegel, R.P., d'Avernas, J., & Best, J.A. Self-management and smoking cessation: A critical analysis and integrative model. Unpublished manuscript, University of Waterloo, 1980.

Schmahl, D.P., Lichtenstein, E., & Harris, D.E., Successful treatment of habitual smokers with warm, smoky air and rapid smoking. *Journal of Consulting and Clinical Psychology,* 1972, *38,* 105–111.

Schmalensee, R. The economics of advertising. In D.W. Jorgensen, and J. Waelbroeck (Eds.). *Contributions to economic analysis.* New York: Elsevier, 1975.

Schmidt, B. Einfluss des Zigarettenrauchens ouf dans EOG. *Klinische Monatsblaetter feur Augenheilkunde* 1970, *156,* 523–531.

Schmidt, R.W. The U.S. experience in non-smokers' rights. *American Lung Association Bulletin,* December, 1975, 11–14.

Schilling, R.S.F., Letai, A.D., Hui, S.L., Beck, G.J., Schoenberg, J.B. & Boonhuys, A. Lung function, respiratory disease, and smoking in families. *American Journal of Epidemiology,* 1977, *106,* 274–283.

Schneider, L. The economic effects of the ban on broadcast cigarette advertising. Ph.D. Thesis, University of California, Los Angeles 1980.

Schoenberg, E.H. The demand curve for cigarettes. *The Journal of Business of the University of Chicago,* 1933, 6, 15–35.

Schouten, M. Tobacco advertising effects on the consumption of tobacco products. Ottawa: Canadian Council on Smoking and Health, 1978,

Schwartz, J.L. (Ed.) *Progress in smoking cessation.* New York: American Cancer Society, 1978.

Sebben, J. Pimm, P., & Shephard, R.J. Cigarette smoke in enclosed public facilities. *Archives Environmental Health,* March–April, 1977, 53–58.

Sehm, M. Savukkeiden hinta kulutuksen saatelijana. [Price and aggregate demand for cigarettes.] *Sosiaalilaaketieteelinen Aikakauslehti,* 1977, *1,* 199–209.

Sherman, S.J., Chassin, L., & Presson, C.C. Social psychological factors in adolescent cigarette smoking. Paper presented at the meetings of the American Psychological Association, New York, September 1–5, 1979.

Shephard, R.J., & Lebarre, R. Current attitudes towards smoking in Toronto. *Canadian Journal of Public Health,* 1978, *69,* 121–126.

Shephard, R.J., & Lebarre, Attitudes to smoking and cigarette smoke: The Toronto Survey, 1976. Unpublished document, 1976.

Shewchuk, L.A. Smoking cessation programs of the American Health Foundation. *Preventive Medicine,* 1976, *5,* 454–474.

Shewchuk, L.A., & Wynder, E.L. Guidelines on smoking cessation clinics. *Preventive Medicine,* 1977, *6,* 130–133.

Shor, R.E., Shor, M.B., & Williams, D.C. The distinction between the anti-smoking and non-smokers rights movement. *The Journal of Psychology,* 1980, *106,* 129–146.

Silverstein, B., Feld, S., & Kozlowski, L.T. The availability of low-nicotine cigarettes as a cause of cigarette smoking among teenage females. *Journal of Health and Social Behaviour,* 1980, *21,* 383–388.

Sinnott, P.R.J. et al. *The relationship between total cigarette advertising and total cigarette consumption in the U.K.* London: Metra Consulting Group, 1979.

Smart, R.G. et al. Preliminary report of alcohol and other drug use among Ontario students in 1981, and changes since 1977 and 1979. Addiction Research Foundation of Ontario, 1981. Substudy No. 1203.

Speer, F. Tobacco and the non-smoker. A study of subjective symptoms. *Archives of Environmental Health,* 1968, *16,* 443–446.

Stanhope, J.M., & Prior, I.A. Smoking behavior and respiratory health in a teenage sample: The Rotorua Lakes Study. *New Zealand Medical Journal,* 1975, *82,* 71–76.

Statistics Canada: *Canadian Statistic Review:* Catalogue 11–003.

Statistics Canada: *Estimates of Population for Canada and the Provinces* 1980, Catalogue 91–201.

Statistics Canada: *Consumer Prices and Price Indices:* Catalogue 62–010.

Statistics Canada: *National Income and Expenditure Accounts,* 1976 and 1981, Catalogue 13–201.

Stedman, R.L. The chemical composition of tobacco and tobacco smoke. *Chemical Reviews,* 1968, *62,* 153–207.

Stewart, P.J., & Rosser, W.W. The impact of routine advice on smoking cessation from family physicians. *Canadian Medical Association Journal,* 1982, *126,* 1051–1054.

Tager, I.B., Weiss, S.T., Rosner, B., & Speizer, F.E. Effects of parental cigarette smoking on the pulmonary function of children. *American Journal of Epidemiology,* 1979, *110,* 15–26.

Taylor, W.N., & Dickinson, V.A. Dangers for children in smoking families. *Community Medicine,* 1972, *21,* 32–33.

Taxes Withering U.K. Industry, *Tobacco International,* April 3, 1981, 61–62.

Teel, S.J. et al. Lessons learned from the broadcast cigarette advertising ban. *Journal of Marketing,* January 1979, 45–50.

Telch, M.J., Killen, J.D., McAlister, A.L., Perry, C.L., & Maccoby, N. Long-term follow-up of a pilot project on smoking prevention with adolescents. *Journal of Behavioral Medicine,* in press.

Tennant, R.B. The American cigarette industry: A study in economic analysis and public policy. New Haven: Yale University Press, 1950.

The Tobacco Tax Act. Revised Statutes of Ontario, 1980, as amended.

Thompson, E.L. Smoking education programs 1960–1976. *American Journal of Public Health,* 1978, *68,* 250–257.

Thompson, M.E., & McLeod, I. The effects of economic variables on the demand for cigarettes in Canada. *Mathematical Scientist,* 1976, *1,* 121–132.

Thoreson, C.E., & Coates, T.F. Behavioral self-control: Some clinical concerns. In R.M. Eisler & R.M. Miller (Eds.) *Advances in behavior modification, Volume 2.* New York: Academic, 1976.

Thornton, D. Personal communication, 1981.

Timbrell, D. Smoking or Health in the 80's. *Canadian Journal of Public Health,* 1981, *72,* 370–372.

Tobacco Advisory Council of Great Britain. Advertising controls and their effects on total consumption. London, 1981.

Tomkins, S.S. A modified model of smoking behavior. In E.F. Borgatta & R.R. Evans (Eds.) *Smoking health and behavior.* Chicago: Aldine, 1968.

Tori, C.D. A smoking satiation procedure with reduced medical risk. *Journal of Clinical Psychology,* 1978, *34,* 574–577.

Trichopoulos, D., Kalandidi, A., Sparros, L., & MacMahon, B. Lung cancer and passive smoking. *International Journal of Cancer,* 1981, *27,* 1–4.

United Nations Conference on Trade and Development. Marketing and Distribution of Tobacco. UN, 1978.

U.S. Public Health Service. *Smoking and health: A report of the Surgeon-General.* Washington, D.C.: U.S. Government Printing Office, 1964 (PHS Publication No. 1103).

U.S. Public Health Service. *Smoking and health: A report of the Surgeon General.* Washington, D.C.: U.S. Government Printing Office, 1979 (DHEW Publication Number PHS 79–50066).

U.S. Public Health Service. *The changing cigarette: A report of the Surgeon-General.* Washington, D.C.: U.S. Government Printing Office, 1981, (Publication No. 81–50156).

U.S. Public Health Service. *The health consequences of smoking: Cancer, a report of the Surgeon General.* Washington, D.C.: U.S. Government Printing Office, 1982, 235–252.

van der Rijt, G.A.J. Jeugd en Antirookinformatie — Een Onderzoek naar de Invloed van "Peer Groups" op Roken en op Het Effet van Antirookinformatie Bij de Jeugd. [Youth and Anti-Smoking Information — An Investigation into the Influence of Peer Groups on Smoking and on the Effects of Anti-Smoking Information among Youth]. Sociologisch Instituut Katholieke Universitait Nijmegen, Drukkerij Trio-Print, Nijmegen, 1979.

Waernberg, K. Ban on advertising — What then. In J. Steinfeld, et al. (Eds.). *Health consequences, education, cessation activities, and government action.* U.S. Department of Health, Education, and Welfare, 1977, 851–855, Publication No. 77–1413.

Wagenaar, A.C. Effects of the raised legal drinking age on motor vehicle accidents in Michigan. *University of Michigan Highway Research Institute Review,* 1981, *11,* 1–8.

Wald, N.J., Idle, M., Boreham, J., & Bailey, A. Inhaling habits among smokers of different types of cigarettes. *Thorax,* 1980, *35,* 925–928.

Warner, K.E. The effects of the anti-smoking campaign on cigarette consumption. *American Journal of Public Health,* 1977, *67,* 645–650.

Watkins, H.H. Hypnosis and smoking: A five-session approach. *International Journal of Clinical and Experimental Hypnosis,* 1976, *24,* 381–390.

Weber, A., Jermini, C. & Grandjean, E. Irritating effects on man of air pollution due to cigarette smoke. *American Journal of Public Health,* 1976, *66,* 672–676.

Weiss, S.T., Tager, J.B., Speizer, F.E., & Rosner, B. Persistent wheeze: Its relation to respiratory illness, cigarette smoking, and level of pulmonary function in a population sample of children. *American Review of Respiratory Disease*, 1980, *122*, 697–707.

Where cigarette smoking rises without advertising. *World Tobacco*, 1981, *72*, 71–75.

White, J.R., & Froeb, H.F. Small airways dysfunction in non-smokers chronically exposed to tobaco smoke. *New England Journal of Medicine*, 1980, *302*, 720–723.

Williams, T. *Summary and implications of review of literature related to adolescent smoking*. Public Health Service, Health Service and Mental Health Administration. U.S. Department of Health, Education & Welfare, Bethesda, Maryland, 1971.

World Health Organization Expert Committee on Smoking Control. *Controlling the Smoking Epidemic*. Technical Report, Series 636. Geneva: WHO, 1979.

Wong-McCarthy, W.J. Social communication functions of adolescent smoking. Research proposal, UCLA, 1980.

Members of Ontario Council of Health

As of January 1, 1982

R.B. Holmes, M.D. Chairman	—	Toronto	
D. Adams, M.S.W.	—	Hamilton	(1982)
C.I. Black	—	Rodney	(1984)
G.E. Connell, B.A., Ph.D.	—	London	(1984)
J.B. Cullingworth, B.Sc.	—	Toronto	(1984)
D. Gordon	—	Toronto	(1982)
D.J. Grant, B.Sc., M.D., C.R.C.P.(C)	—	Kitchener	(1983)
P. Hannam, B.S.A.	—	Guelph	(1983)
A. Hearn	—	Toronto	(1984)
H. King, M.D., C.C.F.P.	—	Midland	(1984)
A.E. LeBlanc, Ph.D. (Appointed Ministry Representative, Nov. 1980)	—	Toronto	(1983)
A. Lynch, B.A., M.A., M.S.L., Ph.D.	—	Toronto	(1982)
J.B. Macdonald, Ph.D.	—	Toronto	(1984)
N. Marossi, Reg. N.	—	Cambridge	(1984)
S.W. Martin, F.C.I.S., F.A.C.H.A.	—	Orillia	(1982)
M. Paikin, B.A.	—	Burlington	(1983)
L. Rosen, B.Sc. (Pharm.)	—	Mississauga	(1982)
Sister M. Smith, R.N.	—	North Bay	(1983)

L. Siminovitch, B.Sc., Ph.D.,F.R.S.C.(C)	—	Toronto	(1982)
E.G. Sonley, D.D.S.	—	Willowdale	(1983)
W. Southam, B.A., M.A.	—	Stoney Creek	(1983)

*Members'terms expire on October 31st of the year indicated.

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Annex E — Library Services
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Annex H — Health Care Delivery Systems

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Supplement No. 6 — Health Care Delivery Systems — Rehabilitation Services
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1971 Reports
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